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People & the Planet

Volume 7 Number 4

SURVIVAL OF SPECIES

Front cover: Frog, Costa Rica
Credit: Bermingham & Isenhart/ Conservation International
Left: Macaws, Amazon, Peru
Credit: André Bärtschi/Still Pictures

People & the Planet

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People & the Planet may be accessed on the Internet:
http://www.oneworld.org/patp/

The next 7,000 days

The most haunting image of species destruction, from many which appear on our television screens, occurred for me while preparing this magazine. It was the bewildered face of a baby orangutan, a little 'man of the forest', rescued from the Indonesian fires. It looked out with all the reproach of our nearest primate relative. I was reminded of George Schaller's comment that "No one who looks into a gorilla's eyes – intelligent, gentle, vulnerable – can remain unchanged, for the gap between ape and human vanishes; we know that the gorilla still lives within us." The image is haunting, too, because we know that just as our own species has grown from some 10 million to 6,000 million in the brief space of 10,000 years, our primate relatives are now among the most threatened species on earth.

Primates occur especially in the tropical forest "hotspots" which are disappearing fast in the face of loggers, land-hungry speculators and small farmers. We have chosen, in this issue, to highlight the concept of biodiversity "hotspots", since some priority setting to conserve key species-rich habitats must form part of any strategy to keep the web of life intact. The new map by Conservation International is just the latest attempt to highlight these critical regions. The fact that it tallies well with other such efforts, such as the World Wide Fund for Nature's Global 200 Ecoregions and BirdLife International's Endemic Bird Areas, only lends credibility to the approach.

But as all our contributors make clear, protecting specific areas will not be enough. Nor will it be enough to do all the good things described in this issue to protect specific species. Much can be done by making wildlife pay for local communities, by involving tribal people in the discovery and care of rare species as Elizabeth Kemf describes in Vietnam, by captive breeding, by encouraging sustainable harvesting, by creating new migratory routes through transboundary parks and by encouraging governments to make 'Gifts to the Earth' such as Turkey's seal sanctuary in the Mediterranean. But beyond that, there will have to be a sea change in public understanding and political will to tackle the problems of over-consumption, inequity and population growth and to slow and stop the waste and pollution which is destroying the natural world and threatening to heat up the entire planet. As Norman Myers warns, we probably have some 7,000 days to set people and the planet on a new course. If that window of opportunity is missed it may take another 5 million years to replenish the earth.

John Rowley

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The following 'associates' are partners in the development and distribution of *People & the Planet*: Audubon, AVSC International, Center for Communication Programs – Johns Hopkins School of Public Health, Centre for Development and Population Activities, Conservation International, Earthwatch, Family Health International, Futures Group, International Institute for Environment and Development, International Union for the Scientific Study of Population, Pathfinder International, Population Action International, Population Concern, Population Reference Bureau, Royal Swedish Academy of Sciences, Television Trust for the Environment, WWF-Alliance for Religions and Conservation.

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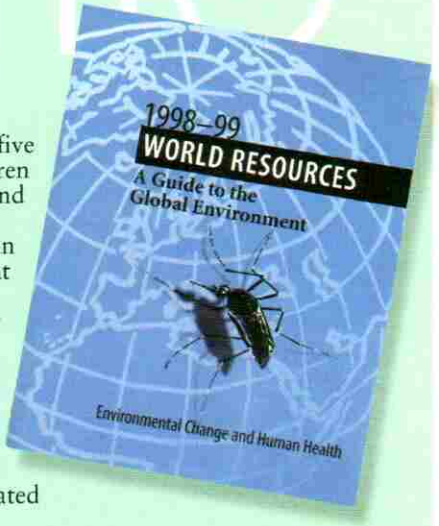
newsfile

GLOBAL HEALTH REPORT



Environmentally-related diseases are the prime cause of death of one child in five in the poorest regions of the world – or a global total of some 11 million children who do not live to see their fifth birthday. They die mostly due to malaria, and respiratory infections and diseases which are largely preventable.

These findings are set out in a report on environmental change and human health jointly released by the World Resources Institute, the UN Environment Programme, the UN Development Programme and the World Bank.

The report says that despite great improvements in human health in recent decades, preventable illnesses are still shockingly prevalent. For example:

- Almost 4 million children die each year from respiratory infections, many of them linked to pollution from indoor cooking stoves.
- Malaria, from mosquitoes which breed in poor environmental conditions, claims 1-3 million lives each year, mostly children.
- Some 2.5 million children die each year from diarrhoeal diseases, also related to the environment around them.
- As many as 5 million pesticide poisonings take place in developing countries due to lack of protection, and many millions more are exposed to lower but dangerous levels.

Developed countries are not immune from environmental threats to their health, says the report, pointing to the 100 million or more people in Europe and North America exposed to unsafe air, the dramatic rise in asthma, the consequences of excessive use of fertiliser, the re-emergence of infectious diseases and the emergence of 30 "new"ones.

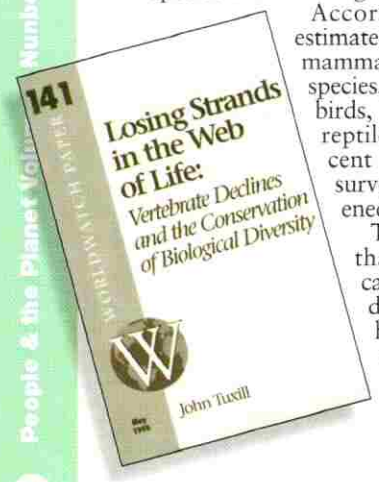
The report calls for an expansion of access to water, sanitation, and hygiene education and a closing of the "health gap" which reflects the widening "income gap" between rich and poor. This is especially urgent in Africa and Asia which face a double threat arising from traditional health and social needs and emerging problems of industrial pollution. It says that while rapid economic growth poses real threats such as badly planned dams, uncontrolled cottage industries and pesticide poisoning, it also provides opportunities to reduce environmental risks, save resources and protect public health.

World Resources Report 1998/99 is a biennial publication of the World Resources Institute, 1709 New York Avenue NW, Washington DC 20006, USA. Oxford University Press, New York, 1998, £18.99.

VERTEBRATE DECLINE

One in four vertebrate species – mammals, fish, birds, amphibians and reptiles – that have been surveyed, are in serious trouble. Their numbers are either falling sharply, or they are limited to dangerously small populations, or they are facing pressures from land clearance, road building, excessive hunting and fishing, or other human activities.

Drawing on the 1996 World Conservation Union (IUCN) survey on the status of animal life, John Tuxill of the Worldwatch Institute, says the well-studied vertebrates provide one of the best windows on how and why all species are declining.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WORLDWATCH PAPER
Losing Strands in the Web of Life:
Vertebrate Declines and the Conservation of Biological Diversity
John Tuxill

According to IUCN estimates, 25 per cent of mammal and amphibian species, 11 per cent of birds, 20 per cent of reptiles, and 34 per cent of fish species surveyed are threatened with extinction.

Tuxill concludes that the leading causes of vertebrate decline include human destruction of old growth forest, wetlands, upland pastures and other rich habitats such as aquatic ecosystems; over-fishing and over-hunting; and the help that humanity gives to invasive species that can decimate native fauna.

Tuxill calls for expanded steps at every level to manage the environment in more ecologically sound and socially equitable ways. This includes toughening existing national institutions such as endangered species programmes, strengthening international laws and agreements for protecting biodiversity; and stabilising world population and reducing over-consumption.

For a copy of Worldwatch Paper 141, *Losing Strands in the Web of Life: Vertebrate Declines and the Conservation of Biological Diversity* contact: The Worldwatch Institute, 1776 Massachusetts Avenue, NW, Washington DC 20036-1904, USA. Tel:(+1 202) 452 1999, Fax:(+1 202) 296 7365 Email: wwpub@worldwatch.org. Website: www.worldwatch.org

CHILD RIGHTS

As usual, the annual *Progress of Nations* report from UNICEF, contains some hard hitting facts about the status of children and the action or non-action by governments to deal with the problems which persist.

Like the *Human Development Report* from UNDP, it lists country performance in league tables so that the laggards stand out. For example, in a revealing section on registration at

Jorgen Schytte/Still Pictures

birth, the report shows that even in countries as advanced as India, Kenya and Ghana fewer than half the children born are registered – and without registration many children are denied immunisation or schooling.

Altogether 40 million babies are born each year without an official name or nationality – or a third of all births.

There is better news about neonatal tetanus, which in 1990 killed 360,000 children in 20 countries where it is was most prevalent. Today the figure is down to 224,000, with big improvements in Brazil and Vietnam, but a slipping back in Nigeria.

The report also shows that there is a long way to go in meeting the reproductive health needs of the largest cohort of young girls ever to enter the fertile age group. For example, nearly a third of girls aged 15-19 in Botswana and Zambia who are sexually active and do not want a child soon, are not

using any means of contraception. The implications for their health, education and future are serious.

The figures on aid and international spending on basic social services are also revealing. Aid is down 16 per cent on 1992 and spending on basic health and education does not even make up 3 per cent of that reduced total. But if the target figure of 0.7 per cent of GNP was universally reached, as it is in the Scandinavian countries, UNICEF says the extra $100 billion a year would be sufficient to ensure, within 10 years, that everyone in developing countries had access to basic education, health care, family planning, adequate nutrition, safe water and sanitation.

The Progress of Nations may be obtained from UNICEF offices or accessed on the Internet at: www.unicef.org/pon98

CD ROM ATLAS

A French-Colombian environmental scientist, Manuel Winograd, has created the world's first CD ROM Atlas for Latin America and the Caribbean that puts together indicators on the environment and the economy. After three years and with UNEP funding, this *Atlas of Environmental and Sustainability Indicators for Latin America and the Caribbean* may just put South America back on the map, *writes Timothy Pratt.*

Winograd and his staff at the International Center for Tropical Agriculture (CIAT) in Cali, Colombia have assembled data from the World Bank, the European Space Agency, and the World Wildlife Fund, and other sources. According to its creator, with this CD Atlas, "ignorance will no longer be an excuse for inadequate environmental policies in tropical America."

As an example of what he calls "gaps in our understanding of environmental problems," Winograd points to the little-known fact that almost half of the deforestation in this region is occurring in dry forests, and not just the rainforests. Yet only 21 per cent of the former remains, compared to 88 per cent of the latter.

"To save what little remains of the dry forest, policy-makers urgently need to rethink decisions about reserves, road building, and development projects. The CD Rom Atlas, with its 200 indicators, will help them do that," said Winograd.

Over the next two years, CIAT will produce a CD Rom Atlas for Central America, with World Bank funding. This will include a section focusing on water resources for Honduras and Nicaragua.

Copies of the CD Rom are available in English and Spanish at US$75 each, plus US$5 for shipping from: CIAT, Publications Distributions Office, A.A. 6713 Cali, Colombia,
Fax: (+57-2) 445 0073,
Email to L. Garcia at: CIAT@CGNET.COM.
The CD ROM Atlas can also be consulted on the following web site:
www.ciat.cgiar.org/indicators/project.html

THREATENED PLANTS

The trade in Europe's medicinal and aromatic plants is now so big that it is threatening populations of some species, according to a report by TRAFFIC, the wildlife trade monitoring programme of the World Wide Fund for Nature (WWF) and the World Conservation Union (IUCN).

The report identifies 150 species that could be at risk in one or several countries from over-collection in the wild – a number likely to climb with further research. At least 1200-1300 of Europe's native medicinal and aromatic plants are used on a commercial basis every year. Most are still taken directly from the wild.

The report, documenting studies in eight countries was the focus of the First International Symposium on the Conservation of Medicinal Plants in Trade in Europe held at London's Royal Botanic Gardens at Kew in June.

The report recommends: enhanced trade monitoring, consideration of international trade controls for particular species, improved legislation and law enforcement, development of specific management programmes, public awareness activities, enhancement of cultivation efforts and future research.

Europe's Medicinal and Aromatic Plants: Their Use, Trade and Conservation by Dr Dagmar Lange is available from:
TRAFFIC International,
219c Huntingdon Road, Cambridge CB3 0DL.
Tel: +44 (0) 1223 277 427, Fax:
Website: www.traffic.org
(There is a shipping charge of £8 to countries within Europe and £10 to those outside Europe).

PROTECTING THE SOIL

Millions of hectares of agricultural land could be protected or saved from degradation and erosion if farmers applied environmentally-friendly tillage, says a recent United Nations report.

Current conventional tillage methods are a major cause of severe soil loss and desertification in many developing countries and soil erosion, accelerated by wind and water, is responsible for around 40 per cent of land degradation, according to the UN Food and Agricultural Organisation (FAO).

"Tillage erosion damages soil in most developing countries where soil losses could exceed 150 tons per hectare annually," says José Benites of the Soil Resources Management and Conservation Service. "Land degradation also occurs in developed countries due to exaggerated mechanised tillage.

"Parts of Latin America and Africa could become dust bowls if farmers don't change their tillage practices," the report warns. "Every time a farmer tills land to control weeds, the soil becomes more vulnerable to erosion and the soil structure is destroyed. Conventional tillage with tractors and ploughs provokes soil compaction and biological degradation. Even animal traction systems, to a lesser extent, lead to erosion. The way soils are cultivated today needs to be drastically changed."

In general, soils in tropical countries do not need to be tilled, Benites says. "Interventions using machinery should be reduced to the minimum possible. The most desirable form of tillage is conservation tillage which leaves a protective blanket of leaves, stems and stalks from the previous crop on the surface. This cover shields the soil surface from heat, wind and rain, keeps the soils cooler and reduces moisture losses by evaporation. Less tillage also means lower fuel and labour costs.

Today, the concept of conservation tillage is mainly applied in the Americas where more than 14 million hectares are cultivated this way.

A workshop held in Harare, Zimbabwe, in June prepared the outline of an African regional project on conservation tillage and formulated the first draft of a code of conduct for soil management.

Contact: John Riddle, FAO Press Office, Viale delle Terme di Caracalla, 00100 Rome, Italy.
Tel:(+39 06) 5705 3259 Fax:(+39 06) 5705 5924.

TEARING DOWN FENCES

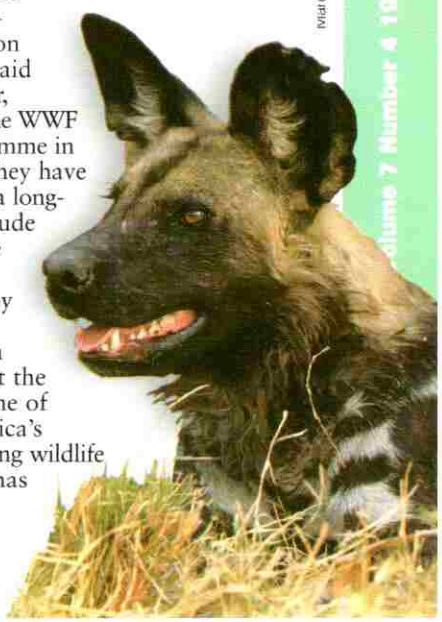
Some of Southern Africa's most charismatic and endangered species, like the Roan Antelope and the African Wild Dog, are getting renewed chances for long-term survival thanks to a decision by the Government of Botswana to remove fences that impeded the movement of wild animals between that country and neighbouring Namibia.

Authorities in Gaborone have announced that they will bring down some 30 kilometres of fence – out of a total of 190 kilometres erected – along the north-western border of Botswana to allow for the free movement of wild animals whose immediate survival had been threatened by their inability to move freely between Botswana and Namibia's Caprivi Strip on their traditional seasonal migratory paths.

Botswana built the veterinary fences in 1997 to prevent further spread of a serious epidemic of Bovine Lung Disease throughout the northwest of the country. It required the government to order the slaughter of some 318,000 head of cattle and it cost the nation's economy around US$150 million.

But nature conservation concerns from Namibia – which has its richest and most diverse populations of wildlife in the narrow Caprivi Strip, in the northeast of the country – prompted Botswanan authorities to reconsider the location of the fences.

"It is a courageous and far-seeing move on their part," said Chris Weaver, Manager of the WWF / LIFE Programme in Namibia. "They have broken with a long-standing attitude regarding the use of veterinary fences by taking into consideration the value that the survival of one of Southern Africa's last free-ranging wildlife populations has for the entire region.



Martin Harvey/WWF

Securing the fabric

Norman Myers, author of *The Sinking Ark*, has spent a lifetime campaigning for the survival of our fellow species. Here he sums up the nature, scale and urgency of the 'great decision' now facing humankind.

Our planet is, so far as we know, the only asteroid in the universe to feature life. And it is life in forms so abundant that we have next to no idea how abundant it is. We send costly space probes to Mars to see if there ever was life there, and if we found anything it would almost certainly be a primitive slime mould or something equally rudimentary. Yet here on Earth we have millions of species that are so advanced that we have little grasp of just how advanced they are.

Yes, millions of them. But how many millions? Nobody has more than a vague clue. Estimates range from 2 million to 100 million, with 'informed estimates' centring on 8-15 million. It is a scandal of modern science that we do not know within an order of magnitude how numerous and multiformed is this super exceptional phenomenon.

In physics we can measure the distance from the Earth to the Moon with an accuracy of half a centimetre. By comparison, the science of biodiversity is still in its Stone Age. So far, we have identified 1.7 million species, and if we keep up our cataloguing at the present rate it will take us several decades to list even half of the species that share this planet with us (and supposing they do not have the extravagance to exceed 10 million).

Despite our grandscale indifference to species and their numbers, we benefit from the many environmental services they supply to us, and do it free. These services range from creation of soil, supply of water, and natural controls of pests, to dispersal of pollutants, functions of watersheds, and stability of weather and climate, to cite but the most obvious items.

Until just recently, these services carried no specific economic values since nobody had bothered to take a crack at estimating them. Result: political leaders and policy-makers effectively marked them down as trifling if not nil. Fortunately David Pimentel and his colleagues at Cornell University have come up with an estimate which, while preliminary and approximate, puts the worldwide total at $2.9 trillion per year. To put proportion on the figure, consider that it is four times as large as Britain's economy.

Below: A Kubu tribesman surveys the effect of a forest fire, Indonesia

Mark Edwards/Still Pictures

Sara Fleetman

Right: The rosy periwinkle contains cancer curing compounds

Kevin Schafer/Still Pictures

# of life

Another team of analysts, this time put together by Robert Constanza at the University of Maryland, has come up with a more expansive estimate – still exploratory but illuminating insofar as it helps us to get a handle on what is at stake in biodiversity: $33 trillion per year, by contrast with the world's economy of $29 trillion. So global natural product is greater than global economic product.

But, some might say, how does this planetary arithmetic translate into better protection for biodiversity on the ground? Consider the many medicines and drugs bestowed by wild plants. The American pharmaceutical giant, Eli Lilley, exploited two biocompounds in the rosy periwinkle to manufacture vincristine and vinblastine, potent therapies against blood cancers. They save 30,000 American lives a year, and sales of the two drugs are worth a whopping half billion dollars a year worldwide.

Encouraged by these commercial successes, another American pharmaceutical company, Merck, has paid more than $1 million to Costa Rica for "bioprospecting" rights in Costa Rica's forests, and it will hand over a percentage of sales revenues if ever its search produces a plant-derived drug. So Costa Rica is making money out of its species through medicine alone, using the funds to help its conservation activities. Lots of other countries are taking note.

Then there are the revenues to be gained from ecotourism, dependent as it is on wildlife and biodiversity. People taking nature-related trips contribute at least $200 billion each year to the national economies of the countries they visit. In 1994, whale watching in 65 countries attracted 5.4 million viewers and generated tourism revenues of $504 million. According to conservative estimates, a pod (group) of sixteen whales at Agate in Japan would earn at least $41 million from whale watchers over the next 15 years, whereas if whalers killed them their carcasses would be worth only $4.3 million. As far back as 1970, ecotourism in Costa Rica's Monteverde Cloud Forest Reserve generated revenues of $4.5 million or $1,250 per hectare, whereas farmland outside the Reserve was earning only $100-300 per hectare.

SNAKE SURVIVAL

The Irulas from Tamil Nadu, in southern India are legendary for their skills as snake catchers. And before the snakeskin trade was banned in 1972, these tribal people killed millions of snakes in the Chinglepet District to supply the trade.

The ban threatened to deprive the Irulas of their main source of income, and if it was to be effective, some alternative was needed. In the late 1970s, a sustainable use scheme was introduced under which snakes are captured, their venom extracted, and then returned to the wild. It has proved a great success.

It is estimated that 99 per cent of the snakes survive, and in 1996 sales of venom to laboratories making anti-virus serum earned the Irulas of Chinglepet US$15,000.

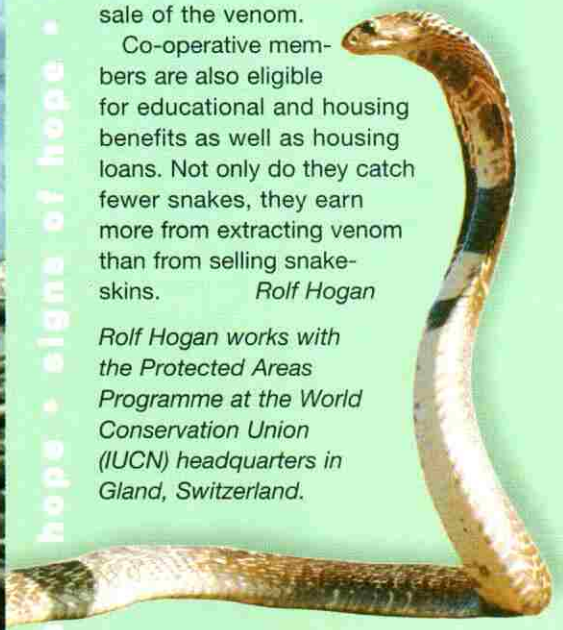
With 100 members, the local co-operative has become the largest snake venom production unit in India, and the only one where the snakes are not killed.

The Irulas use their skills to catch Asian cobra *(Naja naja)*, Indian krait *(Bungarus caeruleus)*, Russell's viper *(Vipera russelii)*, and Sawclawed viper *(Echis carinata)*. Following capture, snakes are weighed, measured, sexed and marked to prevent premature recapture. Each snake is kept for three weeks, and then returned to the wild.

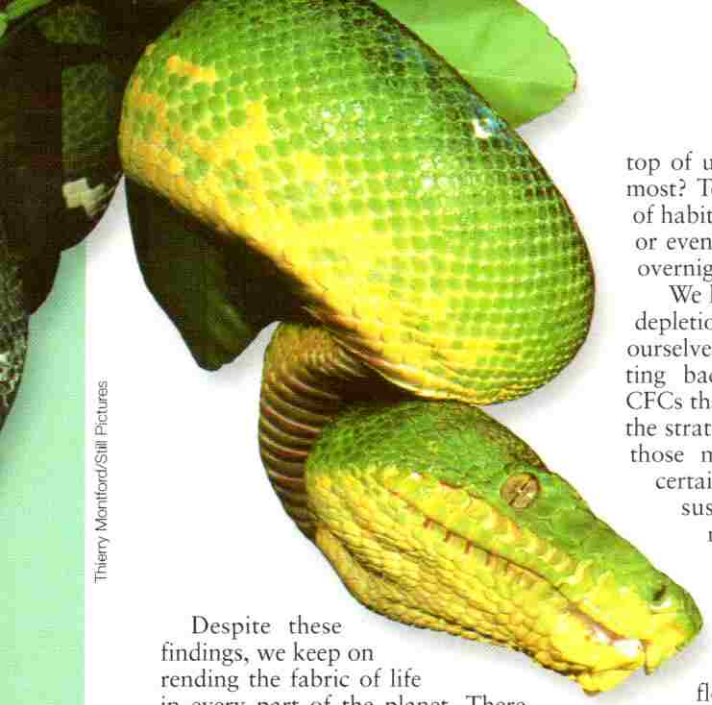
The Irulas now catch only a few thousand snakes from the same area as before. Snake catchers are paid for each snake and receive a share in the sale of the venom.

Co-operative members are also eligible for educational and housing benefits as well as housing loans. Not only do they catch fewer snakes, they earn more from extracting venom than from selling snakeskins. *Rolf Hogan*

Rolf Hogan works with the Protected Areas Programme at the World Conservation Union (IUCN) headquarters in Gland, Switzerland.



Daniel Heuclin/Still Pictures



Thierry Montford/Still Pictures

Despite these findings, we keep on rending the fabric of life in every part of the planet. There are many signs that we are well into a mass extinction of species and populations alike. Within the lifetimes of many readers of this magazine, and supposing we allow the extinction spasm to proceed unopposed (there's lots we can do to tackle it, as demonstrated in this Special Issue), we could well be saying goodbye to half of what we like to call our fellow species. That would put the extinction episode on a par with the "great dying" of the dinosaurs and associated species 65 million years ago, and make it the sixth mass extinction since the first flickerings of modern life 650 million years back.

What we do, or don't do, during the next few decades will determine the outcome of this momentous moment in evolutionary time. Our decision will be the biggest of its kind taken by any human community. We have it in our hands to determine the future of the biosphere for the next five million years, this being the length of time it generally takes evolution to come up with a stock of replacement species with numbers and variety to match what was there before. Five million years is twenty times longer than humans have been a species themselves.

In fact, we may have less than a "few decades" to pull the action levers and get on top of the problem before it gets on top of us. How about two decades at most? To slow and stem the processes of habitat destruction, let alone to halt or even reverse them, cannot be done overnight.

We have done a good job to tackle depletion of the ozone layer (let's give ourselves credit where we can!) by cutting back severely on emissions of CFCs that consume ozone molecules in the stratosphere. This is good news for those many plant species, including certain food crops, that are specially susceptible to enhanced UV-B radiation through "ozone holes." But even if we were to put a total end to CFC emissions forthwith, we must remember that the molecules take ten years to float up into the stratosphere and many more years before they cease their destructive work. We shall be well into the next century before the ozone layer can repair itself.

Much the same applies to other problems. Eroded topsoil cannot be restored within less than a century, yet we keep on doing away with the stuff with ever-greater energy and ingenuity. We could push back the deserts, but it will probably take us a good century to do it. To restabilise climate in a globally warmed world could well take several centuries. All these "environmental insults" will take a heavy toll on wildlands (forests, savannahs, coral reefs and the lengthy like), hence of the habitats of species in their millions. Slowing and stopping the damage will be like turning around a supertanker at sea. When the captain decides on the major "policy change", it will take him a chunk of time to slow his ship and a longer chunk to actually turn it.

Suppose we could manage the corrective shifts within just two decades – and if we can't manage it in that time, we shall surely find the destructive processes will have worked up so much momentum that we shall be on board the equivalent of a runaway tanker. Two decades is 7,300 days. This means that we lose one per cent of our manoeuvring room every ten weeks.

At the same time of course we can do much by way of a holding action through establishing more protected areas. But protected areas protect habitats against something, and that "something" is growing bigger every day and faster than ever.

We could designate the whole of Amazonia as one huge national park, and to keep out landless farmers (who torch the forest merely as a means to get supper on the table) we could build a perimeter fence 50 metres high (though that would take a lot of timber). Our fence would still not keep out global warming, which may one day wreak extreme injury on tropical forests. We may eventually find, indeed, that the burners of fossil fuels (the main source of carbon dioxide emissions) cause more species extinctions than the direct burners of the forests.

In short, the strategy of creating protected areas that has served us well for decades, can no longer deliver on its own. In any case, many protected areas may not survive in the long run. Sure, we need them more than ever as an immediate measure. But let's face it: they respond to symptoms of the basic problem, rather than tackling sources of the problem.

Of course the prime way to tackle the Great Threat is to slow the growth in human numbers and the growth in human demands. That's a story familiar enough to readers of this magazine, and it's a tough tale over the long haul. But a more positive reaction right now is to reflect that what we primarily do to save biodiversity, protecting habitats, will bring us further benefits of all sorts on all sides.

Apart from setting up more protected areas, we need to push back the deserts, replant the forests, stop soil erosion, clean up acid rain, restore the ozone layer, stabilise climate, and the lengthy like. Unless we do these things, we shall effectively be saying goodbye to millions of species – and leaving a planetary habitat for ourselves that will be grossly degraded.

So – and here's the splendid payoff – we need to do all these conservationist things for all kinds of other reasons apart from saving species. In other words, we have reached a stage where, essentially, we can save species only by saving the biosphere. If we allow entire segments of the biosphere to head off into terminal trouble (for instance, we may lose virtually all tropical

Nigel Dickinson/Still Pictures

forests within just a few decades), what will it avail us to have established lots more networks of parks?

The challenges are superscale. They all add up to one true question. Do we really want to save species, those millions of fellow species to which we are saying there is not room on Planet Earth for us and them? To cite the Spice Girls, do we know what we really, really want? ■

Professor Norman Myers is a Fellow of Green College, Oxford, and a Contributing Editor of *People & the Planet*. His most recent book, *Perverse Subsidies* is reviewed on page 35.

Susan A Mainka/WWF-Canon

Top left: Boa Canin, French Guyana
Bottom left: Bush doctor with medicinal herbs, Belize
Top: Giant Panda with her one-month-old baby, Wolong Nature Reserve, China

Getting the measure of extinction

Trying to measure just how fast species are becoming extinct is a tricky business, *writes Georgina Mace*.

For a start, we have a very incomplete knowledge of the earth's biota. Estimates for the total number of species range from 5 million to 60 million, though most experts would place the total at about 10 million. Of these, fewer than 2 million have been described.

Among animals we know the mammals and birds best. There are about 14,000 species and we know most of them. But these numbers are swamped by the one million described insects – which probably make up fewer than 5 per cent of the total.

There are around a quarter of a million described plant species, making up about half the total – and 80,000 described fungi, or about 5 per cent of the total. The remaining species – bacteria, viruses and protists – are so poorly known that nobody can credibly estimate their number. So most of what can be said about extinction relates best to larger plants, mammals and birds.

Like all species, these have been subject to extinction as a fundamental part of evolution. Indeed, of all the species that have ever lived during the 600 million years of the fossil record, only about 2 to 4 per cent survive today.

But how do current extinction rates compare with those in the past? Looking at the fossil record it appears that invertebrate species have had an average life span of 5 to 10 million years. The poorer data for mammals suggests a lifetime of perhaps 1 to 2 million years.

Of recent extinctions the best, but still very incomplete, record is for birds and mammals lost over the last century. This indicates that one species out of 14,000 goes extinct every year – giving an average species lifetime of 10,000 years. This may sound a long time, but is 100 to 1,000 times shorter than the lifetime of species in the fossil record.

Estimating the lifetimes of extant species involves projections based on loss of wild habitat and the extinction processes of well known species.

Drawing on the IUCN Red List of threatened animals, published in 1996, species lifetimes for well-studied groups of birds, mammals and reptiles are estimated at approximately 300-500 years. Across broader groups lifetimes are between 100 and 1,000 years. These values are similar to the estimates made using habitat projections.

So our estimates show that species extinction rates are 1,000 to 10,000 times higher than in the past. This makes current rates of species loss at least equivalent to the mass extinctions of the past – and in as short a time.

We do seem to be on the brink of a large-scale extinction spasm. But a major difference now is that almost all extinctions are due to the impact of human activities. People now so dominate the earth that very few species are completely unaffected by our existence.

Georgina Mace is a research fellow at the Institute of Zoology (London) and member of the steering committee of IUCN's Species Survival Commission.

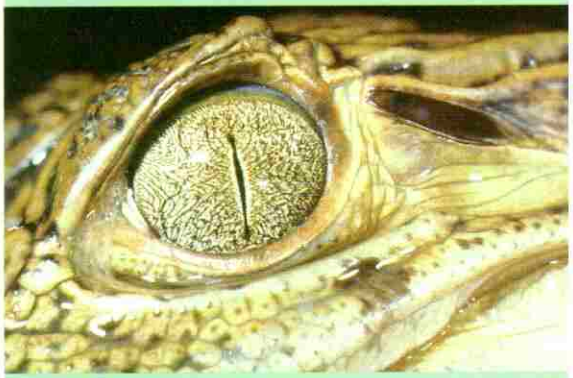
ALLIGATOR HUNT

On the floodplains of the Orinoco Basin in Venezuela, hunting alligators is big business. It is also one that has now been organised as a sustainable export industry, that has created jobs and boosted the economy.

In 1982, the Government lifted the 10-year ban on hunting of the common or spectacled caiman *(Caiman crocodilus)* and began a controlled hunting programme in five states of the llanos region on the Orinoco floodplain. The aim was to promote the sustainable use of caiman by local people.

Today, as many as 150,000 are harvested for their hide and meat each year. The caiman industry is strictly controlled. Hunting is restricted to private lands and landowners must apply for a quota. An application must be accompanied by a caiman census of the lands in question and a five-year management plan to maintain caiman populations and habitat.

André Bärtschi/WWF

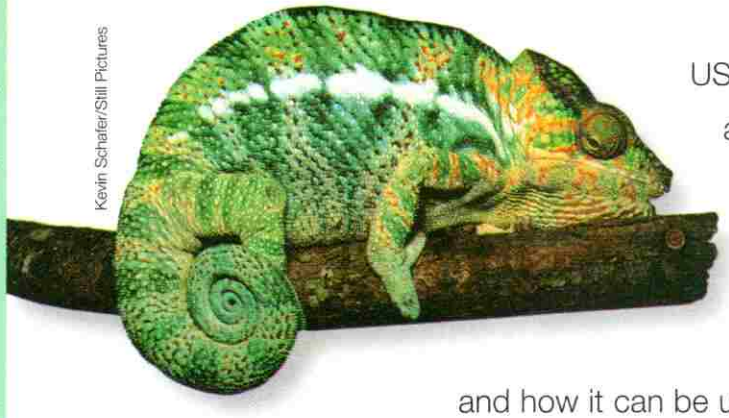


The census report which contains information on the size and make-up of the population, must be carried out by trained and certified experts. Only 25 per cent of males over 180cm in length may be hunted which works out at less than 10 per cent of the total population. Landowners must submit an annual report on the size and make-up of their populations and hunting is suspended in areas where the number of large males does not recover.

All hides and meat must be certified by the members of the Venezuelan National Guard and the size of skins is monitored to ensure that harvesting is sustainable.

Sold mainly for export, caiman hides are treated by local tanners. Caiman meat is salted locally or in one of Venezuela's cities. The controlled hunting programme has stimulated the local economy, creating new jobs and businesses.

Rolf Hogan



Kevin Schafer/Still Pictures

US-based Conservation International has completed an updated version of its Global Biodiversity Hotspots map – showing areas of key importance in the battle to save the planet's diversity of life. Here, **Russell Mittermeier, Ian Bowles** and **William Konstant** explain what the map reveals and how it can be used to develop a global conservation strategy.

Biodiversity hotsp

The Earth's 25 biodiversity hotspot regions collectively cover about two per cent of the planet's land surface, yet claim more than 50 per cent of all terrestrial species diversity. Over the next few decades, focusing conservation efforts on these areas can achieve maximum impact for each dollar spent.

Dr Norman Myers coined the phrase "biodiversity hotspots" in 1988, identifying 10 tropical rainforest hotspots containing an estimated 13 per cent of all plant diversity in just 0.2 per cent of the planet's total land area. In a subsequent analysis, he added several rainforest areas and four Mediterranean-type ecosystems resulting in a total of 18 areas that accounted for 20 per cent of global plant diversity in just 0.5 per cent of the land area.

In 1989, Conservation International (CI) and the MacArthur Foundation were the first organisations to adopt Myers' hotspots as the guiding principle for conservation investment, with CI slightly modifying and expanding Myers' list.

The current analysis is based on species numbers, using vascular plants (250,000 species worldwide) as the principal indicator of biological diversity. Hotspots are identified by two main criteria: first *plant endemism* and then *degree of threat*. In this analysis, we have identified regions with 0.5 per cent or more of total global plant diversity represented as endemic species – each region having a minimum of 1,250 plant species. The areas ultimately identified by this analysis have all lost an estimated 75 per cent or more of their original pristine vegetation, with most of the areas on the final hotspots list in fact having already lost 90 to 98 per cent. Thus far, our analysis focuses only on the terrestrial realm.

We have also looked at patterns of diversity and endemism for mammals, birds, reptiles, and amphibians in the target ecosystems. Not surprisingly, the tropical rainforest hotspots generally have very high vertebrate diversity and endemism, following global trends of plant diversity. In contrast, temperate hotspots like the Mediterranean-type ecosystems and drier tropical hotspots, though very high in plants, tend to exhibit much lower vertebrate diversity and endemism.

Endemism is the principal criterion for hotspot status because endemic species are entirely dependent on a single area for survival, and by virtue of their more restricted ranges, are often the most vulnerable. These species confined to highly threatened ecosystems will almost certainly be the first to be hit by extinction episodes, and are most in need of rapid and effective conservation action.

We believe that biodiversity priority setting exercises must focus first and foremost on *biological parameters*. Threat analysis should come next, highlighting the urgency of conservation action. If we are to have a real impact on biodiversity conservation worldwide, we must emphasise the biologically most important regions regardless of their political or social situation, and do whatever possible to overcome obstacles that might stand in our way.

This is not a trivial consideration. New Caledonia in the Pacific, for example, has been grossly under-funded relative to its global biological importance because of its political status as part of a G-7 country (France). Costa Rica, on the other hand, has received proportionately much more support than other comparably important countries because it has, to its credit, created a very receptive, positive environment for international conservation investment.

Based on our method, the first 25 high priority terrestrial biodiversity hotspots have been identified. Of these, nine are entirely tropical rainforest areas; five include tropical rainforest and tropical dry forest components; three include tropical rainforest, dry forest and arid systems; five are temperate Mediterranean-type ecosystems; one is a mosaic of dry forests and savannahs; one is a temperate forest and steppe; and one is an arid region.

In all, the remaining natural vegetation in these 25 hotspots covers only about 2 per cent of the land surface of the planet, and yet they have within them a phenomenal total of 125,635 plant species, or 50.2 per cent of all plant diversity represented *as endemics*. Of course, these areas also harbour many other non-endemics as well.

Although the analysis of the vertebrate data is not yet complete, we estimate that these same areas will encompass the distribution of between 30 to 40 per cent of all terrestrial vertebrates as endemics. Considering total diversity, we also conservatively estimate that these 25 hotspots will contain no

Why endemism matters

Understanding the importance of *endemism* is key to appreciating the power of the *hotspots* approach to biodiversity conservation. The word "endemic" describes organisms native to a certain region, with restricted distributions. In other words – they are found nowhere else on Earth.

Where critical habitats are threatened, endemic plants and animals are at a far greater risk of extinction than more widely distributed species. Biologists look very carefully at levels of endemism when assessing the conservation status of different ecosystems. The biodiversity hotspots are the highest priorities for protection because they face the most severe threat and they harbour the greatest number of endemics.

less than 50 per cent of all terrestrial biodiversity in only about 2 per cent of the land surface of the planet and possibly much more. Furthermore, our data provides clear indications that at least 75 per cent of terrestrial animal species in the critically endangered, endangered and vulnerable categories, defined by IUCN for globally threatened species, are found within this extremely reduced extent of land.

Among the hotspots, there are top priorities that can sharpen our focus still further. For example, the Tropical Andes hotspot has 20,000 plant species, or 8 per cent of the global total, endemic to it, whereas the Mediterranean Basin, a non-tropical hotspot, accounts for 13,000 plant species, or 5.2 per cent of global plant diversity, as endemics. The top 11 hotspots for plant endemism, harbouring 5,000 or more species as endemics, account for 93,214 plant species, or 37.3 per cent of total global plant diversity, *as endemics*. Again, total diversity in such areas is much higher than what is represented by the endemics alone.

ots revealed

J Y Gropas/Still Pictures

In addition to biodiversity hotspots, major tropical wilderness areas also represent high-biodiversity ecosystems, but they are on the opposite end of the threat spectrum. The hotspots consist mainly of heavily exploited and often highly fragmented ecosystems greatly reduced in extent, with usually less than 25 per cent of original pristine vegetation remaining. The major tropical wilderness areas, on the other hand, are still largely intact, with more than 75 per cent of original pristine vegetation remaining, and have low human population density. Most are found in the southern Guianas, southern Venezuela and adjacent parts of extreme northern Brazilian Amazonia, parts of upper Amazonian Brazil, Colombia, Ecuador, Peru, and Bolivia; parts of the Congo Basin, and much of the island of New Guinea.

The major tropical wilderness areas represent important storehouses of biodiversity and major watersheds, and play a vital role in climate stability. They are very often the last places where indigenous peoples have any hope of maintaining their traditional lifestyles, and they will serve as controls against which to measure the management of the more devastated hotspots. Major tropical wilderness areas are also likely to assume even greater recreational, aesthetic, and spiritual values on an increasingly overcrowded planet.

Once we have determined the globally most important hotspots and wilderness areas, we can proceed with the next steps in what we refer to as the *hierarchy of priority setting* (global, regional, national, local and specific priority sites). Fortunately, a great deal of this more specific priority setting has taken place simultaneously with (and has been heavily stimulated by) various global priority setting processes over the past decade. All of these have considerable agreement.

For instance, if one compares the most critical of the World Wildlife Fund's Global 200 Eco-regions, the most important Endemic Bird Areas of BirdLife International, and the WWF/IUCN Centres of Plant Diversity, with CI's Biodiversity Hotspots, the same regions usually rise to the top, among them the Tropical Andes, Madagascar, the Atlantic Forest Region of Eastern Brazil, the Mesoamerican Forests, the Philippines, most of Indonesia, the Cape Floristic Region of South Africa, and New Caledonia.

In any case, the original message of Myers' hotspots analysis echoes loud and clear: a very high percentage of global terrestrial biodiversity can be protected in a very small portion of Earth's land surface, and international efforts to conserve terrestrial biodiversity should focus heavily, but not exclusively, on these areas.

Now we must agree on the most important and collaborative action to ensure that as much as possible is conserved. ■

Russell Mittermeier is President of Conservation International and Chairman of the Primate Specialist Group of the IUCN Species Survival Commission. Ian Bowles is Vice President of Policy and Bill Konstant is Special Projects Director with Conservation International.

• *Conservation International is working with Norman Myers on refining and expanding the hotspots analysis. This article represents a preliminary account of their findings.*

Left top: Male Panther Chameleon, Madagascar

Left centre: Butterfly, Asia

BENIGN TRAPPING

Unregulated fur trapping by the Indians of the Yukon took off at the time of the Klondike Gold Rush, just 100 years ago. Beavers and other fur-bearing species were put under great pressure. But in the early part of this century laws were enacted to control trapping, and to allow the animal populations to recover. So successful has this proved that no fur species is currently threatened by trapping.

Today, fewer than 800 people, most of them from the First Nations, are eligible to trap for furs in the 480,000 km² of the Yukon. Furs are sold on the national or international fur markets or used locally for clothing and the cottage garment industry. Fourteen species are trapped including, lynx, grey wolf, wolverine, arctic fox and coyote.

Trapping is regulated through five-year renewable Registered Trapping Concessions, or RTCs which can be given to groups or individuals. Covering over 90 per cent of the Yukon, concessions and group areas are thought to be large enough to disperse trapping pressure and allow species such as wolverine, which require large areas of habitat, to be trapped sustainably.

Trappers participate in day-to-day management, carrying out population surveys, adjusting trapping levels to population size and establishing refuge areas for hunted species.

When compared to forest fires and other natural catastrophes to which the boreal forest ecosystem is resilient, fur trapping is thought to have a negligible impact on fur bearing species and their environment. The main threat to wildlife in the Yukon is the loss of habitat to agriculture and forestry.

Rolf Hogan

B & C Alexander/Still Pictures

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Guinean forests

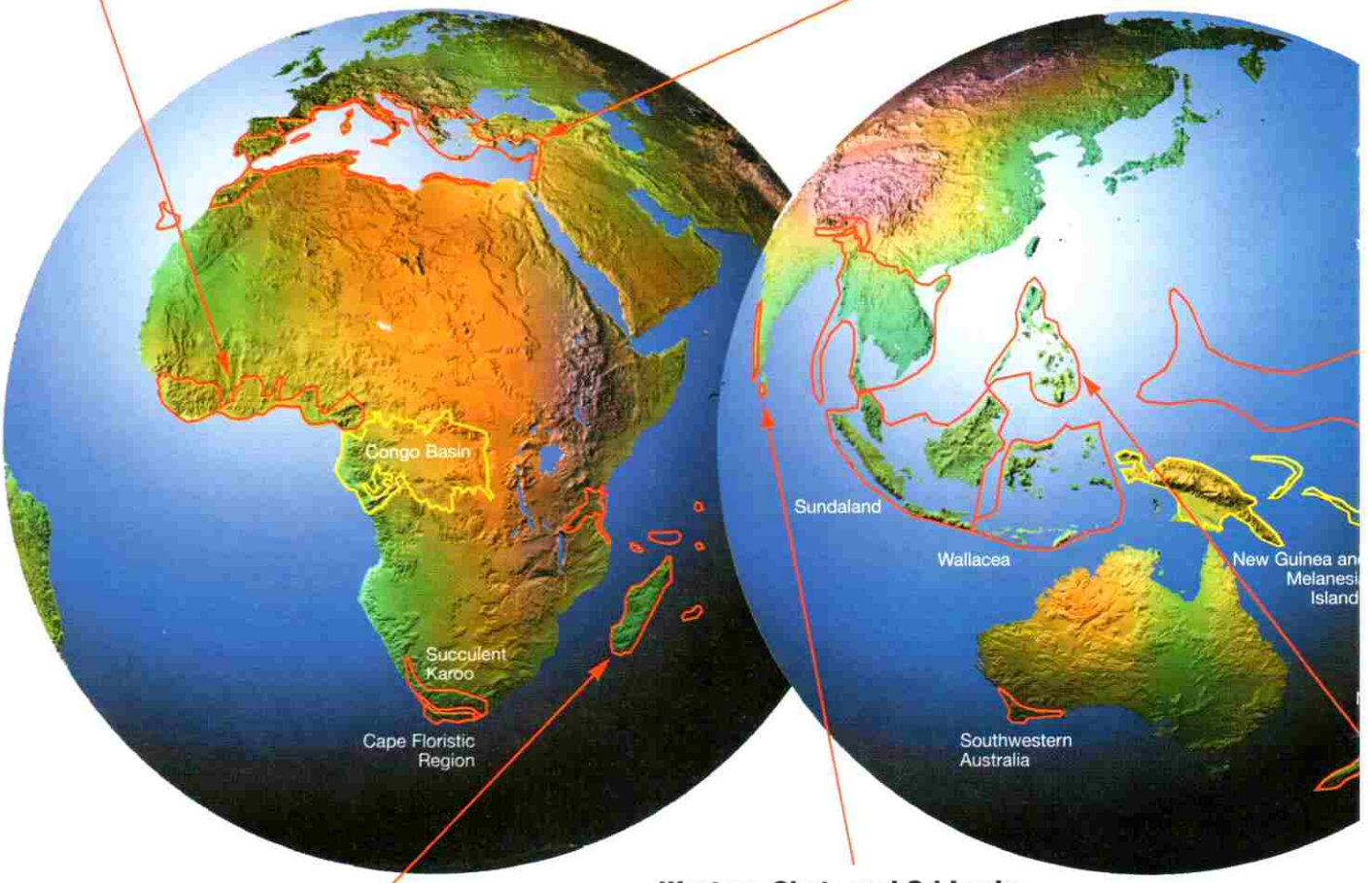
Incorporating parts of Sierra Leone, Guinea, Cote d'Ivoire, Cameroon, Nigeria, and Ghana, and all of Liberia, the Guinean Forests of West Africa have an abundance of flagship species and a high rate of endemism. The pygmy hippopotamus, Diana monkey, and drill (a large forest-dwelling baboon) are all endemic to this region. As many as 8,000 species of plants exist in these forests, of which some 2,000 are endemic.

Threats to the wildlife in the Guinean Forests include extensive habitat fragmentation and deforestation due to logging, slash-and-burn agriculture, and mining. Bushmeat hunting for local consumption and trading has also led to declines of primate and antelope populations, and ivory poaching threatens forest elephants.

Schafer & Hill/Still Pictures

Mediterranean Basin

One of the largest and most populated of the hotspots, the Mediterranean Basin encompasses 2.3 million square kilometres. It is home to more than 300 million people and stretches from Portugal to Jordan and from the Canary Islands to northern Italy. Ten per cent of the Earth's plant species can be found in this hotspot – a richness of species unmatched by any other. More than half of the 25,000 plant species are endemic to the Basin



Madagascar

Located 240 miles (400 kms) off the east coast of Africa, the world's fourth largest oceanic island, Madagascar, has been separated from other land masses for more than 160 million years. Its unique plant and animal species have evolved in isolation, resulting in high rates of endemism which distinguish Madagascar as a biodiversity hotspot. More than 7,000 species of higher plants, 106 mammal species and 450 reptile and amphibian species are found exclusively in Madagascar.

The greatest threat to the biodiversity of Madagascar is deforestation. Approximately 90 per cent of Madagascar's primary forest habitat has been lost due to cattle grazing, agriculture, firewood, logging, and mining. As communities encroach upon remaining natural habitats, even the forests and wildlife that occur within protected areas are threatened.

Olivier Langrand/Still Pictures

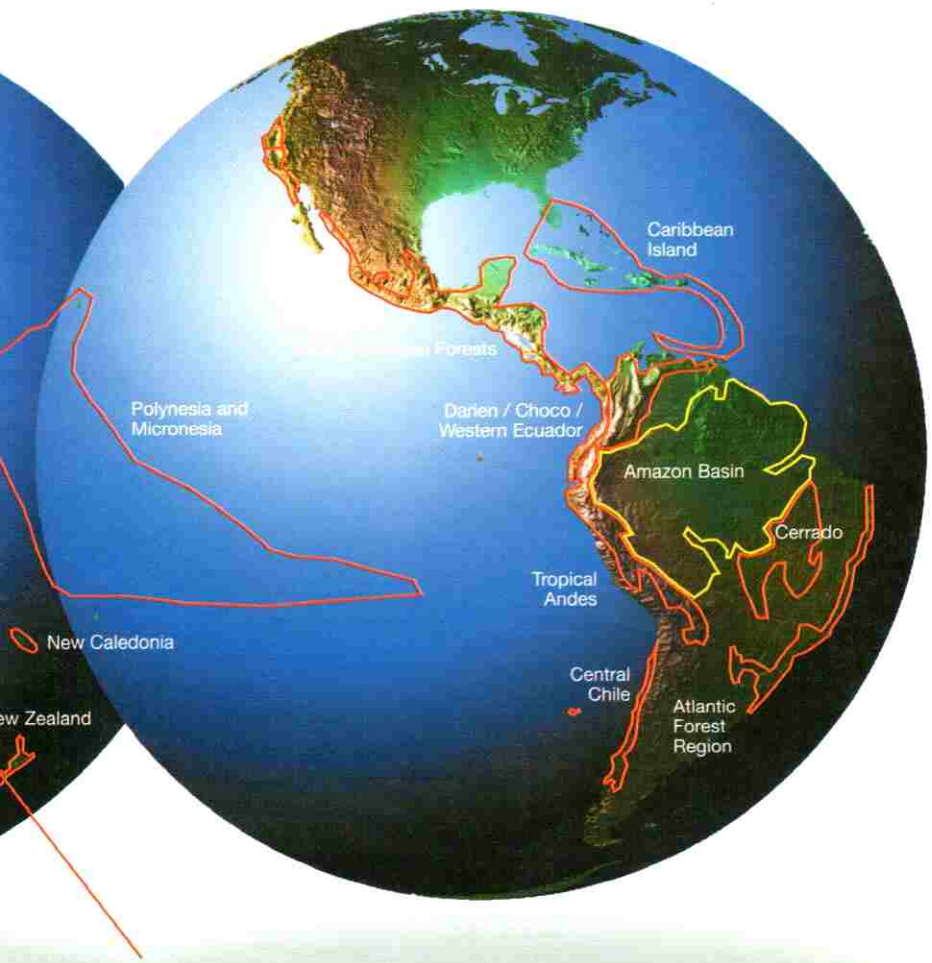
Western Ghats and Sri Lanka

The mountains of the Western Ghats of southwestern India and the highlands of southwestern Sri Lanka are separated by 400 kms of water, but they are strikingly similar in their geology, climate, and evolutionary history. A high number of species, many endemic, are found in both parts of this hotspot. Approximately 18 million people rely on resources from the forests in the Western Ghats and Sri Lanka. These forests include more than 4,700 species of plants, 46 per cent of which are found only in this region. High demand for forests species with commercial value, along with rapid development has put this hotspot under critical threat of biodiversity loss. Species like the Indian tiger and the Asian elephant, whose numbers have dwindled due to poaching and loss of habitat, have become important international "flagships" for tropical forest conservation.

Roland Seitre/Still Pictures

and new species are discovered regularly. While the numbers of species of plants in the Basin are impressive, they are found in small numbers among scattered patches broken up by agriculture and urban development. Of the vertebrates, reptiles and amphibians occur in the greatest numbers followed by birds and mammals.

Michel Gunther/Still Pictures



Philippines

The Philippines is dubbed the "hottest of the hotspots" because only 6-8 per cent of the country's original vegetation still exists. Extreme pressure is being put on the biodiversity of the Philippines due in large part to population growth and development. The more than 7,000 islands of this archipelago are home to exceptionally high numbers of plants, birds, and mammals. More than 30 per cent of the birds – including the Philippine eagle, the largest and rarest eagle in the world – are found only in the Philippines. Seventy per cent of the higher plants and 55 per cent of the mammals are also endemic to this country.

The incredible biodiversity of the Philippines also extends to its seas, which probably have the highest diversity of coral species on Earth. The Philippine seas are also threatened, however, by cyanide and dynamite fishing and coastal development.

R. Kennedy/Still Pictures

FARMING THE ROO

In Blackhall Shire, western Queensland, more than one million kilogrammes of kangaroo meat was left to rot in 1992. Competing with sheep for the same grazing lands, kangaroo and wallaby are shot as pests by rural Australians. Now, with the legalisation of kangaroo meat for sale in all Australian states, there is hope of a sustainable future for the kangaroo.

Because it was illegal to sell kangaroo meat for human consumption in most Australian states, more than half the 3.5 million legally killed each year became carrion. The rest were fed to dogs, cats and crocodiles. Australia's semi-arid scrubland, which makes up 40 per cent of the country has been overgrazed by sheep for more than 100 years and lands have become seriously degraded. For farmers the

Dave Watts/Still Pictures

answer has been to reduce grazing pressure by killing more kangaroos. Now, by creating a legal market for kangaroo meat, it is hoped that kangaroos will be seen as a source of income by farmers encouraging them to reduce sheep numbers rather than kill kangaroos illegally. Reducing sheep numbers will take pressure off rangelands and encourage the recovery of native vegetation and wildlife.

Each year state governments meet to agree on hunting quotas to maintain current population levels. The major long term threat to kangaroo populations is not controlled harvesting but the loss of natural habitat to farming. Kangaroo meat is actively promoted by the government and restaurants all over Australia now regularly serve Kangaroo.

Rolf Hogan

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Saving the hot

Saving and protecting biodiversity needs a comprehensive approach – involving science, economics and policy. Everyone concerned will have their own contribution to make, but some examples of Conservation International's efforts to protect biodiversity hotspots and wilderness areas may be instructive.

On the science front, there is an urgent need to document the earth's biodiversity in more detail. To do this, CI's Conservation Biology Department has been running a Rapid Assessment Program (RAP) since 1990 to conduct quick and intensive surveys of threatened ecosystems.

RAP expeditions have discovered a number of previously undescribed plants and animals, including seven new mammal species in South America's Andean region and 34 new species of coral in Papua New Guinea and the Philippines. Such discoveries offer further evidence that science has only identified between one and three per cent of the Earth's species.

CI has also built up a network of more than 1,300 environmental institutions, most from high biodiversity countries, and trained several hundred natural resource specialists in the use of Geographic Information Systems.

Valuing nature

Efforts are also needed to demonstrate the true economic value of biodiversity. As a dynamic arrangement of complex, evolving ecosystems it buffers the world against climatic shifts, provides watershed protection and performs a host of other global services. It can also be valued for the way its maintains geopolitical stability, and in terms of the way it provides for international export, regional and local markets, and the people living nearby.

A case study carried out in Bahia, Brazil, has shown how valuing biodiversity can drive local development and help conservation simultaneously.

Southern Bahia is the richest portion of Brazil's Atlantic forest region, a centre of endemism, and holder of the world record for tree diversity – 456 different species in a single hectare. This diversity is threatened largely by cattle-ranching and logging, which analysis shows to be losing propositions for local landowners. Cattle ranchers can expect to lose $50 per year for each hectare converted to pasture, while timber nets a one-time windfall of about $500 per hectare. Meanwhile, southern Bahia's beaches attract 300,000 visitors a year, and it has been shown that the value of a

Russell Mittermeier

vacation to the region would be halved if forests were lost, but would increase by more than $50 per visitor if forest attractions are added.

In response, Conservation International recently constructed an aerial canopy walkway in the forest as an attraction within a newly-created nature reserve to promote ecotourism as a way to protect biodiversity within the region.

Ecotourism is just one means of conserving biodiversity. CI's Enterprise Program has demonstrated that shade coffee production and sustainable harvests of Brazil nuts in Peru, tagua nuts in Ecuador, chicle, xate palm and allspice in Guatemala, and ngali nuts in the Solomon Islands can provide significant employment for forest communities, safeguard tropical forests and wildlife, and supply international markets with food, personal care and floral products.

spots

Policy options

International assistance can have a big impact on biodiversity conservation in the world's hotspots. And the practices of large-scale extractive industries (timber, oil and gas, and mining) should not be treated merely as symptoms of a global problem; they can be changed and used as tools to minimise biodiversity loss.

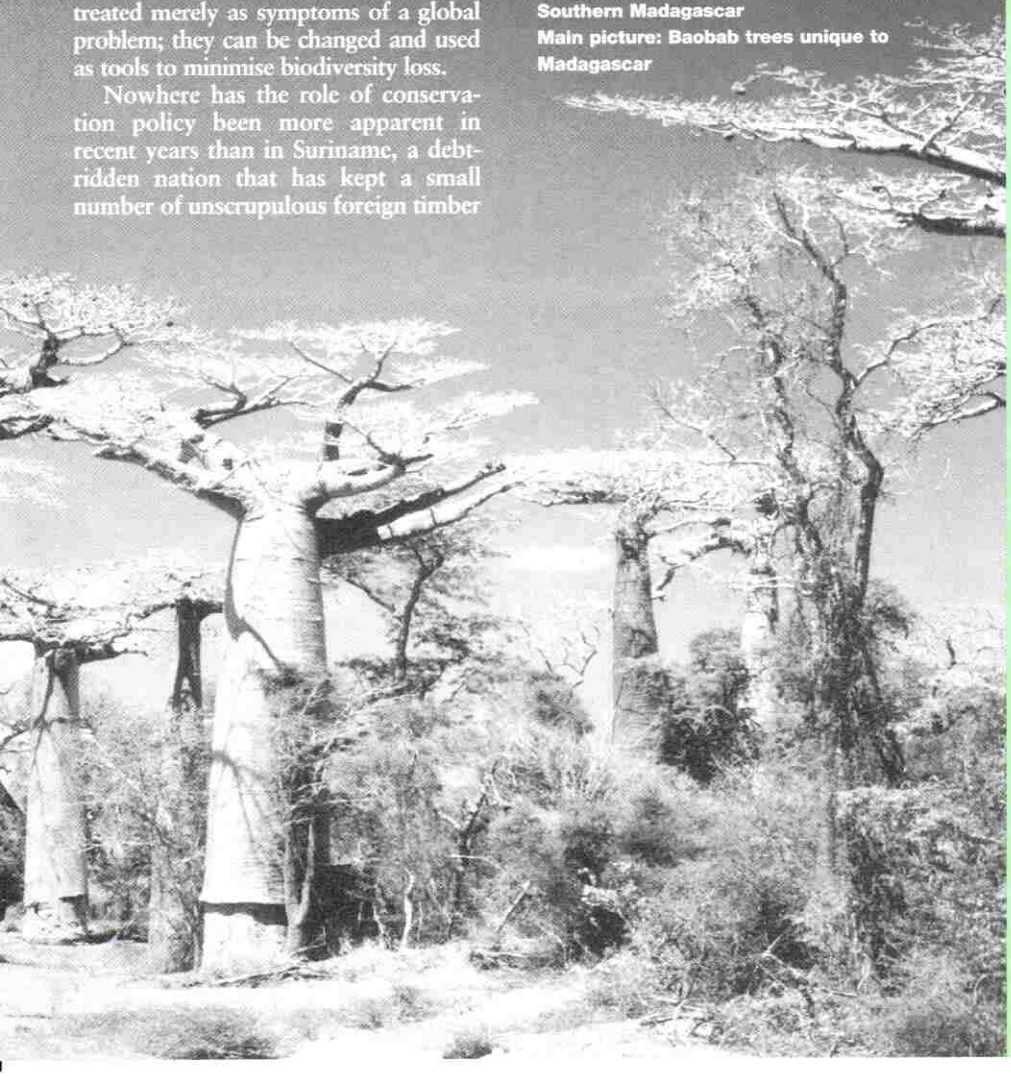
Nowhere has the role of conservation policy been more apparent in recent years than in Suriname, a debt-ridden nation that has kept a small number of unscrupulous foreign timber companies at bay in favour of protecting much of its biodiversity-rich forests.

Martin Harvey/WWF

With a population of 412,000, Suriname is one of the world's least densely populated and most heavily forested countries, claiming more tropical forest cover than all of Central America combined.

Working with Conservation International's Policy Department, the Government of Suriname recently agreed to more than double the national protected area system by establishing a 10,000 km²-corridor linking three existing nature reserves and creating the 1.5 million-hectare Central Suriname Nature Reserve. The importance of this new reserve goes beyond the fact that it is one of the largest in all of South America – it is also entirely uninhabited and one of the world's last remaining tracts of pristine rainforest. Instead of selling off its future, Suriname has chosen instead to explore economic alternatives to logging, including bioprospecting and ecotourism. ■

Above: Ring-tailed Lemurs, Southern Madagascar
Main picture: Baobab trees unique to Madagascar



SEAL SANCTURARY

The rarest seal in the world - the Mediterranean Monk Seal - may have been saved from extinction after three years of conservation activity and public pressure.

With only 200-300 seals left in the Mediterranean, agreement has been reached with the Turkish Government to declare five sites along a 200km stretch of the Cilician coast of southern Turkey as a permanent, and totally protected, sanctuary. These shores, with remote caves and beaches, are home to one of the last remaining colonies of Monk Seals in the Mediterranean.

As First Degree Natural Protection Sites they will be totally protected against exploitation, logging and construction building. Trawlers will be kept at bay by barbed trawl traps which damage any fishing gear which attempts to trawl across it. Local fishermen are also involved in the protection plan.

The sanctuary was provided as a 'Gift to the Earth' by the Turkish Government, as one of many being sought by WWF by the year 2000, as part of a global network of marine protected areas.

Allessandra Poggiani

Allessandra Poggiani is Communications Officer with WWF Marine Programme.

F. di Domenico/WWF/Panda Photo

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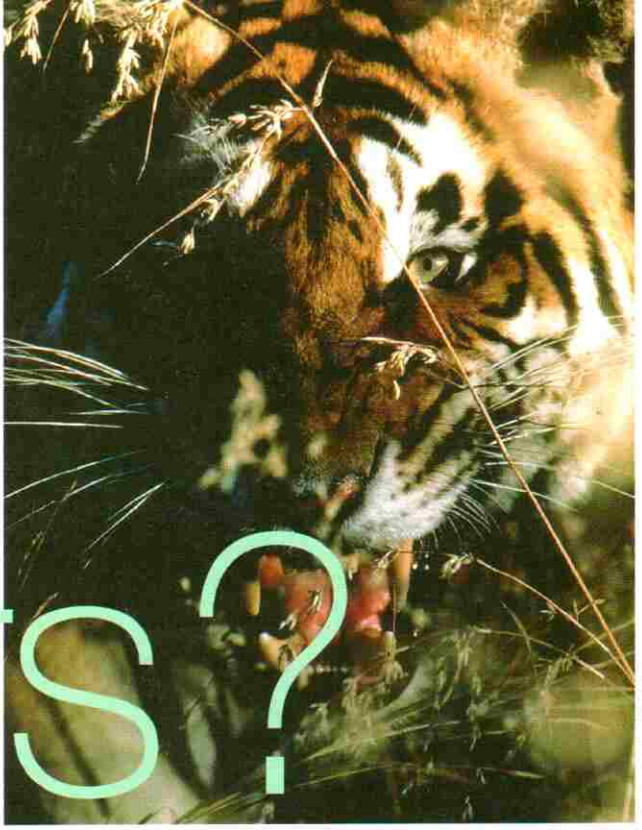
Flagship Species 1: The Tiger

The promotion of charasmatic species, such as the tiger, is an important way of mobilising support for habitat conservation. In the first of a series of reports on Flagship Species, **Peter Jackson** says there is still a chance to save the tiger from extinction in the wild – if there is a will to do so.

A future for tigers?



Gunter Ziesler/Still Pictures

Humans and tigers have coexisted since time immemorial at the summit of food chains which form part of the complex web of life on earth. They have gone about their lives conscious of, but not dependent on, each other's existence. Today, humans dominate the world, and the tiger is at their mercy.

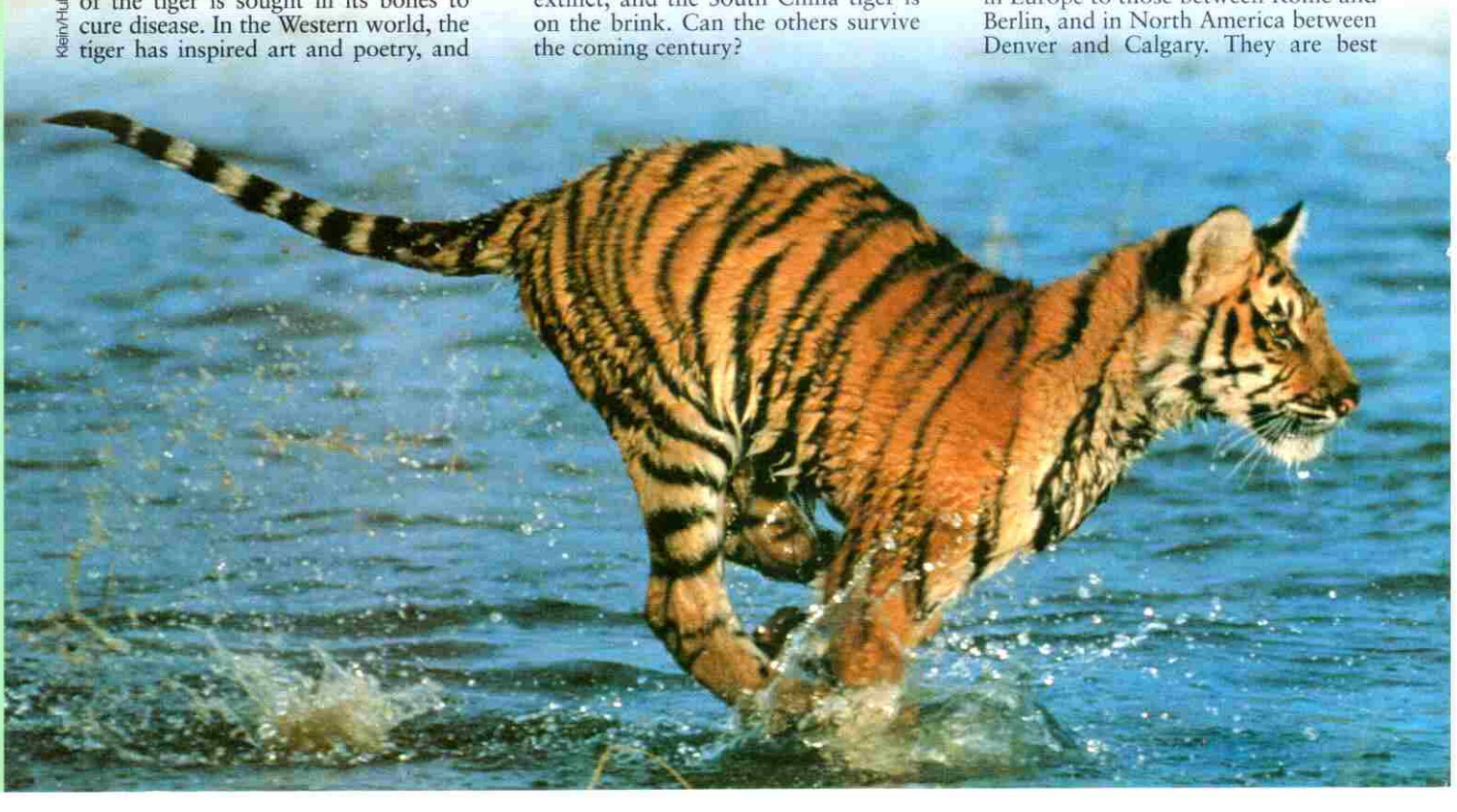
Throughout the ages, the tiger has had a remarkable impact on the human mind. Millions of Hindus worship the image of Durga, the powerful female deity, who rides a tiger. Siva, God of Destruction and Creation, is enthroned on a tiger skin. Tigers feature in Buddhist culture in China, Korea and Japan. And in the forests, tribal people still tend simple shrines to the tiger. For many Asians, the power of the tiger is sought in its bones to cure disease. In the Western world, the tiger has inspired art and poetry, and has been adopted as the advertising symbol of leading businesses. Yet we humans are near the verge of wiping out this majestic animal.

Nobody really knows how many wild tigers there are. Counting such a secretive animal is immensely difficult, and most estimates are little more than guesses. However, there may be between 5,000 and 7,500 – a small fraction of the 100,000 which may have roamed the forests a century ago. An exploding human population, conversion of wild lands for settlement and agriculture, and ruthless hunting of its prey, and of the tiger itself as a trophy and a pest, have brought the tiger to its present plight. Three of the eight subspecies – Bali, Javan and Caspian – are already extinct, and the South China tiger is on the brink. Can the others survive the coming century?

Although there had been concern about the tiger's decline, it was only in 1972 that serious conservation efforts began. India, under the determined leadership of Prime Minister Indira Gandhi, launched Project Tiger, and the Bengal tiger began to rebound. Behind the Iron Curtain, the USSR had long before started to rehabilitate the little-known tigers of the eastern Asia.

Most people associate tigers with hot countries, but in Russia, China and Korea tigers thrive in winter snows and sub-zero temperatures. They are widely known as Siberian tigers, but, in fact, their home is not the dark coniferous forests that stretch across northern Russia; they live in deciduous forests in latitudes similar in Europe to those between Rome and Berlin, and in North America between Denver and Calgary. They are best

Klein/Hubert/Still Pictures



referred to as Amur tigers, from the Amur river basin which has always been their homeland.

In mid-century, their numbers in Russia had been reduced to fewer than 50, although China and Korea still had many hundreds. The Soviet government initiated strict conservation measures, and by 1990 there were about 400 Amur tigers in Russia, while those in China and Korea had been reduced to a mere handful.

The collapse of the USSR created a new crisis for the Amur tiger. As the economy fell into disarray, law and order collapsed. People in the Russian Far East, traditionally hunters, began to compete with tigers for deer and wild boar as food. The tiger itself became a target because its bones and other body parts were in demand in China for medicine, while skins could be sold for as much as $10,000 in Japan and South Korea. Poaching reached levels between 1992 and 1994 that provoked fears of the Amur tiger's early extinction. A Russian minister declared that the tiger population had been reduced to fewer than 200. International organisations rushed aid to equip anti-poaching units, which proved effective in lessening poaching, while a ban in China strengthened border controls on the illegal trade in tiger products.

Meanwhile, Russian and American scientists studying tiger ecology used the winter snows of 1995-96 to track tigers and analyse their footprints in order to estimate numbers. The results were heartening: 330-371 adults and 85-94 cubs. Clearly the Amur tiger was surviving. Importantly, nearly all these tigers constitute a single sub-population in continuous forests in the territory of Primorye and part of Khabarovsk. This may be the largest single population left and from a genetic point of view it is a healthy situation.

Large blocks of potential tiger habitat also exist in south-east Asia, but the dense rain forests make counting tigers and other animals exceptionally difficult. Ground surveys suggest that tigers have been greatly reduced in numbers. But there could be more than thought; camera traps in Way Kambas National Park on the Indonesian island of Sumatra have led to identification of 37 tigers where local people had scarcely seen any.

India boasts more than half the world's surviving 5,000-7,500 tigers, but the population has been heavily fragmented by loss of habitat. Only three reserves are estimated to have over 100 tigers, and some have fewer than 30.

Has the wild tiger a future? The vulnerability of isolated small groups of tigers to poaching and genetic deterioration through inbreeding, along with continued habitat loss to human use, suggests that numbers will continue to decline. The larger sub-populations have a reasonable chance. But, ultimately, the tiger will only live on if people are willing to coexist with it. The tiger is potentially a danger to livestock and even to human lives. Effective management of tigers to minimise damage to human interests, along with wise behaviour to avoid confrontation, is necessary.

Extinction of the wild tiger would provoke a deep sense of loss among many people at the elimination of a powerful symbol of the natural world. Not only would it remove a key species from the web of life on which we all depend, but it would bode ill for the survival of other threatened wildlife, perhaps even for ourselves if the natural foundations of life continue to be destroyed. ■

Peter Jackson is Chairman of the Cat Specialist Group at the World Conservation Union (IUCN) in Switzerland.

Top left: Bengal tiger, Ranthambhore National Park, India

Below: Siberian tiger

More about cats

For information about the IUCN Cat Specialist Group and a review of the status of all the 36 species of wild cats contact Peter Jackson at IUCN, Route des Macherettes, 1172 Bougy, Switzerland. Tel/Fax: (+41 21) 808 6012, Email: pjackson@iprolink.ch

Peter Jackson is co-editor with Kristin Nowell of *Wild Cats: Status Survey and Conservation Action Plan,* IUCN, Gland (1996), £26.75/$40.00, available from: IUCN Publications Services Unit, 219c Huntingdon Road, Cambridge CB3 0DL, UK. Tel: +44 (0)1223 277 894, Fax: 277 175, Email: iucn psu@wcmc.org.uk Or: Island Press, Box 7, Covelo, CA 95428, USA. Tel: 800 828 1302 (toll free USA/Canada), Fax: +1 707 983 6414, Email: ipress@igc.apc.org

Cat News, the group newsletter, is available for a minimum donation of SF45/$40 to Friends of the Cat Group, c/o Peter Jackson, Route des Macherettes, 1172 Bougy, Switzerland.

THE MIDWIFE TOAD

Alessio Pettreti/WWF/Panda Photo

The Mallorcan Midwife Toad or Ferreret *(Alytes muletensis)* is one of the world's rarest amphibians. Confined to a few remote ravines in the mountains of Mallorca, it is found only at high altitudes where snakes prey on it.

It breeds readily in captivity and has been the subject of a captive breeding programme based at several places across Europe. For several years, captive-reared animals have been successfully reintroduced to Mallorca, with the result that the number of localities where the species now lives has been doubled.

As in other Midwife toads, the male cares for the eggs until they hatch, carrying them in strings entwined around his hind legs. This 'sex role reversal' leads to a situation in which females often have to compete for the parental services of males, by calling to them and sometimes by fighting one another.

Dr Tim Halliday

Thomas Stephan

Flagship Species 2: Elephants

Living with elephants

Elephants are thriving in parts of southern Africa. **Charlie Pye-Smith** travelled to Botswana and Zimbabwe to find out why.

"Every year between 1992 and 1997," says Chief Lux Masule, one eye warily tracking three elephants which amble past us, "someone was killed by an elephant in the Chobe Enclave." One year it was a vet; another it was a policeman. Frequently it has been peasant farmers working their fields. Such deaths are to be expected as the Enclave's 7,000 inhabitants live on a strip of land which lies between the Chobe River – a magnet for game – and forest which supports a huge concentration of elephants.

For centuries, the villagers harvested wild animals for meat and hide, but during colonial times the relationship changed, with the British Government effectively assuming ownership of game. After independence, the Botswanan Government stuck to the policies established by its predecessors: the State, not the people, determined the fate of wildlife.

"In 1989," explains the chief, "we asked the government to give us back the right to manage the wildlife ourselves." Four years later the Chobe Enclave Conservation Trust (CETC) was established. Its principal aim is to generate profits for the community through the sale of a hunting quota.

This year 12 bull elephants will fetch around £4,000 each. Of this income, 15 per cent will be retained by the trust; the rest will be divided equally between the five villages in the Enclave. Over the past few years they have built grinding mills, classrooms, a campsite, a petrol station and a range of other facilities.

Across the border in Zimbabwe, the idea that wildlife must pay its way if it's to survive outside protected areas has influenced life in the communal areas – where 70 per cent of Zimbabweans live – for almost a decade.

Under the Communal Areas Management Programme for Indigenous Resources – Campfire, for short – district councils can apply for the authority to manage wildlife outside national parks. Today, 36 out of 57 rural councils which have joined the programme sell a hunting quota to a safari operator who in turn arranges for wealthy hunters, mostly from the United States and Europe, to shoot big game. The hunting quota is set annually and must be agreed upon by the Department of National Parks to ensure that the harvest is sustainable. So far, over 90 per cent of Campfire profits ($1.6 million in 1995) come from sport hunting, and two-thirds of this from hunting elephant.

Campfire was the brainchild of conservationists who believed that wildlife was unlikely to survive outside protected areas unless there was an incentive to tolerate and protect it. "In the old days," explains Champion Chinoyi of the Zimbabwe Trust, "poachers were considered as heroes, and the villagers would give them shelter from the authorities." Why? Because wild animals raided crops, occasionally killed people and brought no benefits to the impoverished farming communities.

To see Campfire in action I travelled to Nyaminyami district, one of the first to adopt the programme back in 1989. Councillor Mercyman Sianembwa, who showed me round his ward, had lost most of his crops to elephants this year and the day I arrived a farmer was killed by a buffalo, but the villagers of Mola Ward 3 are philosophical. Yes, they say, wildlife does cause problems, but the benefits from wildlife far outweigh the problems for most people.

Ten years ago few children got a decent education; now Mola has a primary school serving 700 children, as well as a grinding mill, a workshop making paper out of elephant dung and a range of other projects. "Everything you see has been built from the profits of Campfire," explains the Councillor proudly. This year Campfire revenue is paying the wages of 27 infant teachers and half a dozen game scouts.

So the people are conspicuously better off in Mola, but what about the animals? Poaching has been much reduced, partly as a result of the vigilance of the game scouts, but also because the council culls 150-odd impala a year and sells the meat at cost price to the villagers.

In other parts of Zimbabwe I talked to villagers who were digging huge holes in dried-up river beds so that elephants could get water and survive the drought: before Campfire, they would have been all too happy for the elephants to die. Of course, poaching continues, especially for the pot, but it is much reduced now that the people in communal areas have a vested interest in looking after wildlife. As far as the elephant is concerned, its numbers rose from 46,000 in 1980 to 64,000 in 1995. The annual hunting quota of around 150 elephants for the communal areas works out at about a sixth of the annual increase.

Campfire is far from perfect. In one area I visited, the villagers were bitterly angry as the council and the safari

Charlie Pye-Smith

operator had failed to deal with the elephants which regularly raided their fields, and most had lost all their maize and much of their cotton. The benefits from Campfire are also patchy, with a small number of wards receiving very large dividends, and many gaining relatively little. These are faults which are readily admitted by everyone involved with Campfire: indeed it would be astonishing if such an innovative programme covering such a vast area was consistently successful.

However, potentially the most damaging criticism is coming from animals rights groups in the United States, led by the Humane Society of the United States. They claim that the programme is "biologically unsustainable" and that the communities are neither managing nor benefiting from the programme. This is clearly untrue, as elephant numbers continue to rise and a third of the country is now devoted to wildlife management. Though the latter criticism is true for some areas, it is nonsense for others.

It is hard to find an impartial voice in this increasingly fractious debate, but one independent organisation which is monitoring the progress of sustainable use programmes is the International Institute for Environment and Development (IIED). "What worries us," says Christo Fabricius of IIED, "is not just the misinformation put out by the animal rights lobby. A vast number of projects like Campfire initially depend on outside help to get them started. The critics might succeed in stopping some of this seed-funding." Indeed, the animal rights lobby is putting considerable pressure on the United States Agency for International Development, which has helped to fund Campfire.

Above: A village in the Nyaminyami District, Zimbabwe
Below: Bull elephants and impalas at a watering hole

A month after I saw Chief Masule he wrote to remind me of the annual elephant kills in Chobe between 1992 to 1997. His letter read: "The record for 1998 has been completed. On Monday 15 June, my own uncle of my age was killed by elephants while looking for his stray cattle about 1.5 km from home. The deceased was severely mutilated, leaving him partially identifiable."

News that outsiders are against Campfire is reaching the villagers. Many are indignant: these are *our* elephants, they say. For them this is a very practical matter. They must make a living beside the elephant, and if the culling of a few helps to bring greater prosperity to rural areas, and at the same time ensure the survival of the species, then programmes like Campfire and CECT must be the best way forward. ■

Charlie Pye-Smith is a freelance journalist specialising in environment and development issues.

Martin Harvey/WWF

DEER ON THE BRINK

A remarkable recovery for the world's most endangered deer is being engineered in the Philippines, where the Spotted deer *(Cervus alfredi)* was down to just 13 animals in 1990. By December 1997 that number had grown 560 per cent to 73, more than half of which were born in captivity.

The Spotted deer has been wiped out in at least 95 per cent of its former range in the West Visayas region of the Philippines – itself one of the world's highest priority areas of conservation concern. Covering the islands of Cebu, Negros, Guimaras, Panay and Masbate it has as many recently extinct and endangered endemic vertebrates as the rest of the Philippines put together.

The decline of the Spotted deer was not fully appreciated until Roger Cox of the IUCN Conservation Project undertook a

W.L.R. Oliver/Flora and Fauna International

three-month survey in 1985. This led to two recommendations: the setting up of a new national park in west Panay to protect the sole remaining wild population, and an international co-operative captive-breeding programme.

The Spotted deer was adopted as the 'flagship species' for promoting increased conservation interest and assistance for this most dire conservation region.

The programme has introduced some new, and widely copied collaborative protocols and has succeeded, at least, in bringing this species back from the brink.

William Oliver

William Oliver is Chairman of the World Conservation Union's Pigs, Peccaries and Hippo Specialist Group and South East Asia Regional Co-ordinator of the Deer Specialist Group and Conservation Programmes Co-ordinator in the Philippines.

Klein/Hubert/Still Pictures

Flagship Species 3: Birds

For over 10 years BirdLife International has been working on a Biodiversity Project, using birds to identify areas of high species endemism, where conservation resources can be most effectively directed. **Alison Stattersfield** reports.

Saving birds, sa

BirdLife's Biodiversity Project has revealed that over a quarter of all birds – that is, 2,561 species – have restricted ranges: they are confined to areas of less than 50,000 km² (the size of Costa Rica). These small areas overlap to form Endemic Bird Areas (EBAs).

Most restricted-range species – 93 per cent of them – are encompassed by 218 EBAs, with over three-quarters of these located in the tropics and sub-tropics. The 2,561 restricted-range birds include 816 species that are currently classified as globally threatened with extinction, almost three-quarters of the 1,111 threatened bird species in the world.

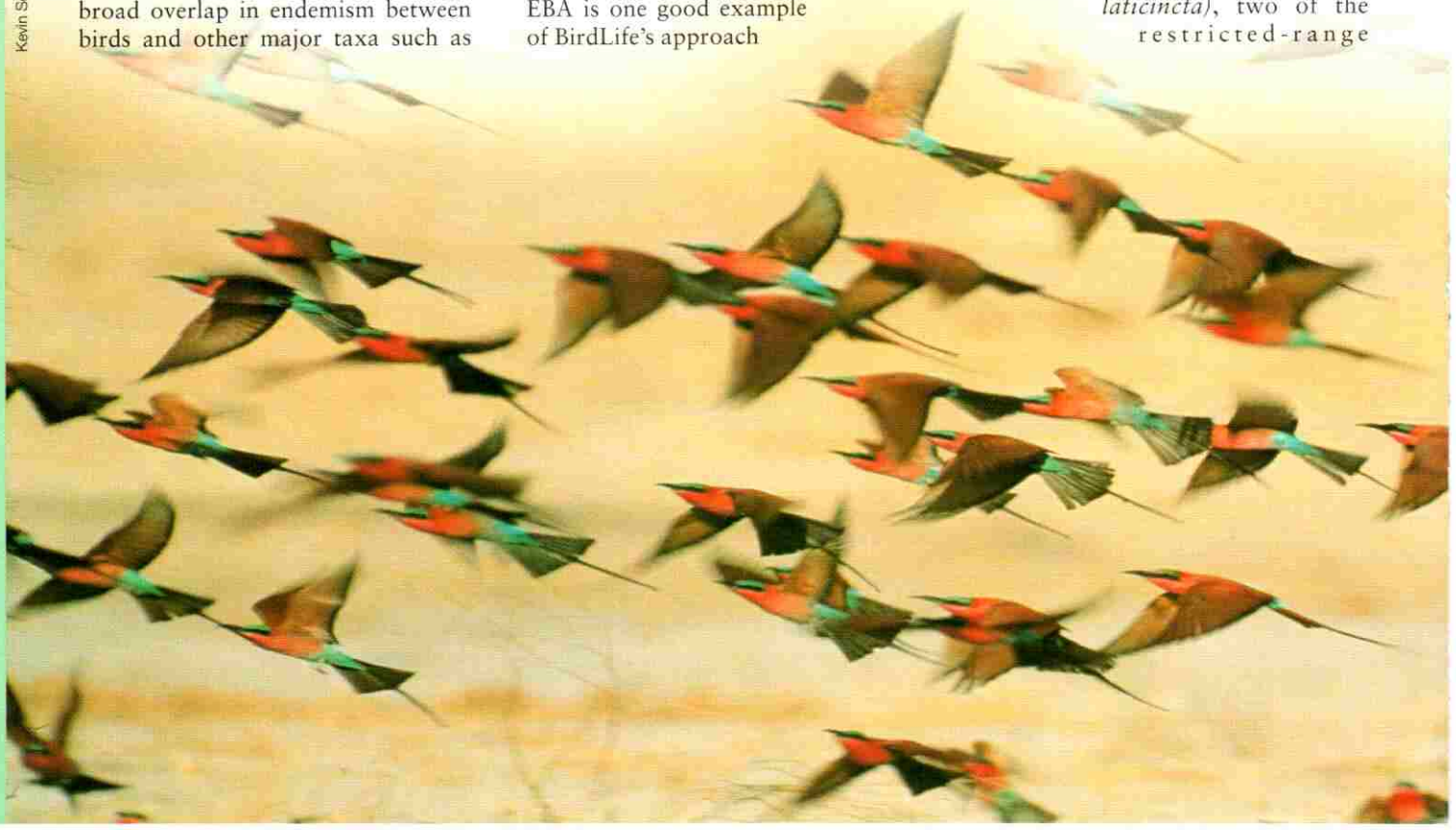
EBAs vary in size from a few square kilometres to more than 100,000 km² and in the numbers of restricted-range species they support – from 2 to 80. The natural habitat, however, in most EBAs is forest. Research has shown that there is broad overlap in endemism between birds and other major taxa such as plants, amphibians, reptiles and butterflies.

These findings show that a major part of the earth's biodiversity can be conserved by focusing conservation resources and actions within a relatively small total area – equivalent to only 1 per cent of the earth's land surface. EBAs of the world are thus clearly priorities for conservation action. BirdLife is identifying the most important sites (Important Bird Areas-IBAs) for restricted-range species within the Endemic Bird Areas and working to protect them. At a national level, information on Endemic Bird Areas can be used directly in the implementation of conservation agreements and conventions, particularly so for the Convention on Biological Diversity, which requires member states to identify important areas and ecosystems.

The Cameroon Mountains EBA is one good example of BirdLife's approach to saving species and habitat. This area comprises the chain of mountains that runs through western Cameroon and adjacent south-eastern Nigeria, and the mountains on the island of Bioko. It supports 29 restricted-range bird species, 10 of which are threatened and confined to this one area alone.

The main threat in the Cameroon Mountains is forest loss, caused by unsustainable exploitation for timber and firewood, overgrazing, fire damage and agricultural encroachment. This is particularly serious in the Bamenda-Banso highlands, where half the forest cover has been estimated to have been lost between 1965 and 1985. Mount Oku in the highlands is the largest area of forest remaining in the Bamenda-Banso highlands, and represents the only hope for survival for Bannerman's Turaco (*Tauraco bannermani*) and Banded Wattle-eye (*Platysteira laticincta*), two of the restricted-range

Kevin Schafer/Still Pictures



species that have highly localised ranges and populations estimated at fewer than 10,000 birds. BirdLife International has been running the Kilum-Ijim Forest Project to conserve the montane forests there since 1987. The project uses the charismatic Bannerman's Turaco as a flagship species to focus attention on the wider issues of forest loss.

One of the best hopes for its continued survival rests on its strong cultural value to the Kom people of the forest. Making the link between forest clearance and the declines of valued wildlife is increasing the chances for working for effective conservation of the bird's habitat. Traditional leaders (the Fon, and his Council, the Kwifon) are strong supporters of the project. They are actively encouraging people to carry out conservation, and are discouraging damaging practices such as burning, cutting of live trees and grazing of goats in the forest. People are still allowed to use the forest in a sustainable way, however. The project is also working with the Ministry of Environment and Forest, which is seen as key to institutionalising the process and making it sustainable. Kilum-Ijim Forest Project has already achieved notable success.

It was once predicted that if forest clearance trends continued, all the forest in the Cameroon Mountains would be gone by 1992. Today, the project, by using a bird species to increase conservation awareness and by working closely with local people, has ensured the survival of much endemic wildlife in a forest that remains a resource for local communities. ■

ving species

Roger Fotso/BirdLife International

Alison Stattersfield is a Senior Research Officer at BirdLife International. She may be contacted for further information at: BirdLife International, Wellbrook Court, Girton Road, Cambridge CB3 0NA, UK. Email ali.statt@BirdLife.org.uk

Endemic Bird Areas of the World: Priorities for Biodiversity Conservation by Alison Stattersfield, Michael Crosby, Adrian Long and David Wege, BirdLife International, 1998, ISBN 0946888337

Top left: Hyacinth Macaw, Brazil
Above: Bannerman's Turaco, Mount Oku, Cameroon
Below: Carmine Bee Eaters

Flora and Fauna International

PIGMY HOG COME-BACK

The pigmy hog *(Sus salvanius)* is the world's smallest, rarest and probably the most specialised wild pig in existence. It is also an important 'indicator species' - that is one of the first to disappear in a disturbed area (including protected area).

Indeed, it has already disappeared in many areas which continue to support more familiar populations of relatively less immediately threatened species such as elephants and rhino.

Apart from the obvious loss of habitat from human expansion, the evidence suggests that this is due to widespread annual burning of grasslands and other factors which reduce species diversity. In any event the pigmy hog has disappeared from over 99 per cent of its former range and now survives in only one (Manas National Park), or possibly two (the Subankhata Reserve Forest) – both near India's northern border with Bhutan.

These are not places where it is safe to hang around, owing to the insurgency problem, so the field research has been severely hampered. But the Pigmy Hog Conservation Programme has been remarkably successful in its captive breeding programme. This has increased from 6 to 42 animals: a 700 per cent increase in three years.

It is hoped to start a series of reintroduction projects in the near future.

William Oliver

Flora and Fauna International

Flagship Species 4: Amphibians

'Amphibians may be harbingers of a global ecological catastrophe' says **Professor Tim Halliday.**

Where have all the frog

Regis Cavignaux/Still Pictures

On 1987, the Golden Toad (*Bufo periglenes*) failed to appear at its usual breeding sites in the Monteverde Cloud Forest Preserve in Costa Rica; it has not been seen since. The Golden Toad is the most celebrated example of an amphibian species apparently becoming extinct over the last 20 years, but it is only one of many. In Monteverde alone, 20 out of 50 frog species have apparently vanished.

In 1989, the first World Congress of Herpetology was held in Canterbury, UK, and it became clear that sudden declines among amphibians were not confined to Central America. Similar events were reported from South America, eastern Australia and the Pacific northwest of the USA. In many instances, amphibians were disappearing from nature reserves, national parks and other areas set up to protect biodiversity.

The declining amphibian phenomenon seemed to be telling us two things. First, it cast serious doubt on the assumption that animals can be protected by setting up reserves. Secondly, it suggested that amphibians are subject to some adverse environmental process that affects them on a global scale.

At first, this second conclusion proved to be highly controversial. Many ecologists working on amphibians, notably in southeastern USA, had not detected any declines in the populations of frogs, toads and salamanders that they had been studying for many years. What they had found is that it is characteristic of most amphibians that the number of adults returning to breeding sites from year to year fluctuates enormously. They suggested, therefore, that the declines reported elsewhere in the world might simply be population fluctuations.

It was clear that issues of this kind could only be resolved by carrying out appropriate research, and that the situation required urgency. The response of the herpetological community was the setting up in 1991 of the Declining Amphibian Populations Task Force (DAPTF), a global organisation of scientists and volunteers. The DAPTF now has more that 3,000 members, most of whom belong to one of over 100 regional or national working groups. The task of these groups is to find out which amphibians are declining and where. Other issue-based working groups are looking at potential causes of amphibian declines, such as chemical contaminants, climatic and atmospheric change, and disease.

The DAPTF has not yet answered the questions that it set itself in 1991, but it has gathered together a mass of information that is helping us to better understand what is happening. It is clear, for a start, that declines are occurring on a global scale, although there are some regions in the world where they are not.

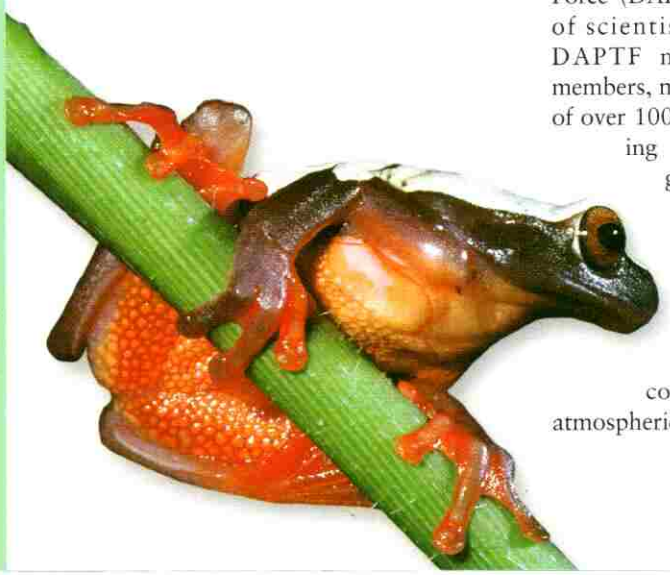
It is apparent that many declines are explicable in terms of habitat change resulting from human activities such as deforestation, draining of wetlands, and changes in agricultural land use. In Europe, for example, most population declines are explicable in terms of loss of suitable habitat, both aquatic and terrestrial.

Andi P. Fogden

Before the DAPTF was formed, amphibian declines were typically detected after the event; people noticed that frogs weren't there any more. More recently, however, biologists have been in position to witness some declines as they occur, notably in central America. A feature of these reports is that many are associated with outbreaks of disease.

Are amphibians being affected by totally new diseases, or by diseases that have been accidentally introduced from other places? Alternatively, are they succumbing to infections that they can normally resist, because their immune systems have been weakened by other factors, such as pollution or climate change? These are questions that require research and the DAPTF is fostering appropriate studies as a

André Bärtschi/WWF



s gone?

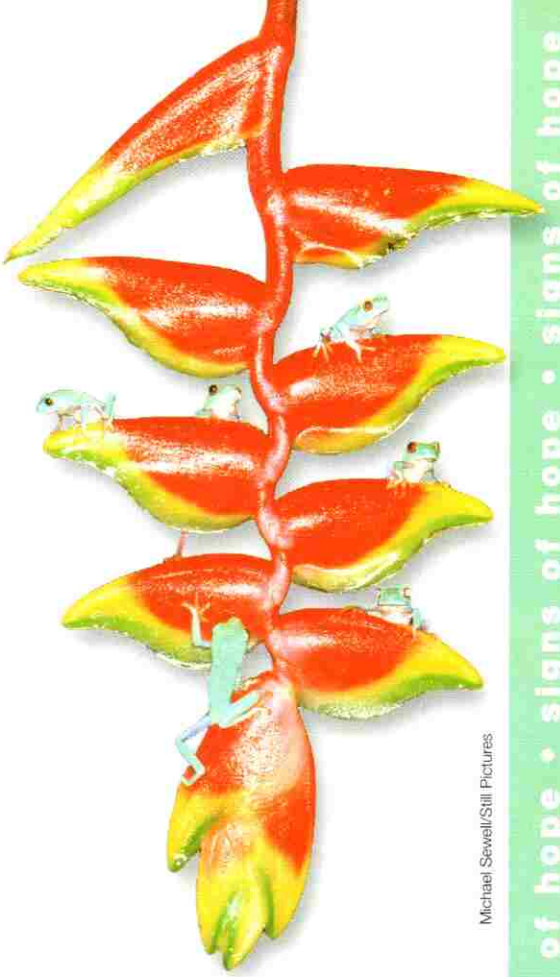
matter of urgency.

A great deal of research has focused on the possibility that increased levels of UV-B radiation, caused by thinning of the Earth's ozone layer, may be cause of amphibian declines. A number of studies have shown that the levels of UV-B that are now reaching the ground, particularly at high altitude, are very harmful to the developing eggs of some amphibians, but not to all. Some of these studies also suggest that eggs exposed to elevated UV-B are also more susceptible to infection by fungus. It has yet to be established, however, that increased UV-B has actually caused any amphibian populations to decline and it cannot account for declines in habitats, such as tropical forest, where UV radiation does not reach ground level.

As eggs, larvae and adults, amphibians lack any kind of protection from the environment, such as a shell or a dry skin. This makes them peculiarly sensitive to chemical contamination and a lot of research carried out by members of the DAPTF has examined the harmful effects of pesticides, herbicides and fertilisers on amphibians. For example, detailed research in Yosemite National Park in California suggests strongly that dramatic declines among amphibians over the last 80 years are due to chemical contaminants blown by the prevailing wind from the agricultural area in California's Central Valley to the west of the Sierra Nevada.

Why should we care that amphibians are declining? There are many reasons, most of them common to other components of the Earth's biodiversity. Amphibians may, however, be sending out a special message. Because of their great sensitivity to changes in both aquatic and terrestrial habitats, they may, like the coal miner's canary, be giving us early warning of major and widespread changes taking place in the environment. The factors that have been shown to adversely affect amphibians, like solar radiation and chemical contamination, threaten all forms of life, including humans. Amphibians may be harbingers of a global ecological catastrophe that is only just beginning. ■

Dr Halliday is Professor in Biology at The Open University and International Director of the DAPTF.



Michael Sewell/Still Pictures

M. & C. Denis Huot/Still Pictures

Top left: Stripeless Tree Frog, Camargue, France
Centre left: Golden Toad spawning, Monteverde, Costa Rica
Bottom left: Tree frog, Manu National Park, Peru
Top: Red-eyed Tree Frog on heliconia flower, Belize
Below: Waterfrog, France

signs of hope • signs of hope • signs of hope • signs of hope • signs of hope

ZULU HARVEST

Traditional Zulu sleeping mats are made from the salt marsh rush *(Juncus kraussii)*, known locally as ncema. The mats are used in most rural households and are given to the bride at Zulu wedding ceremonies. The rush is also used in the growing tourist craft industry. But ncema is scarce and the salt marsh habitat is disappearing under the tide of development. The hope is that sustainable harvesting can save the rush, but it will be touch and go.

There are now only four sizeable stands of ncema left in Kwa-Zulu Natal. One of the four stands covers 600 hectares of Greater St Lucia Wetland Park.

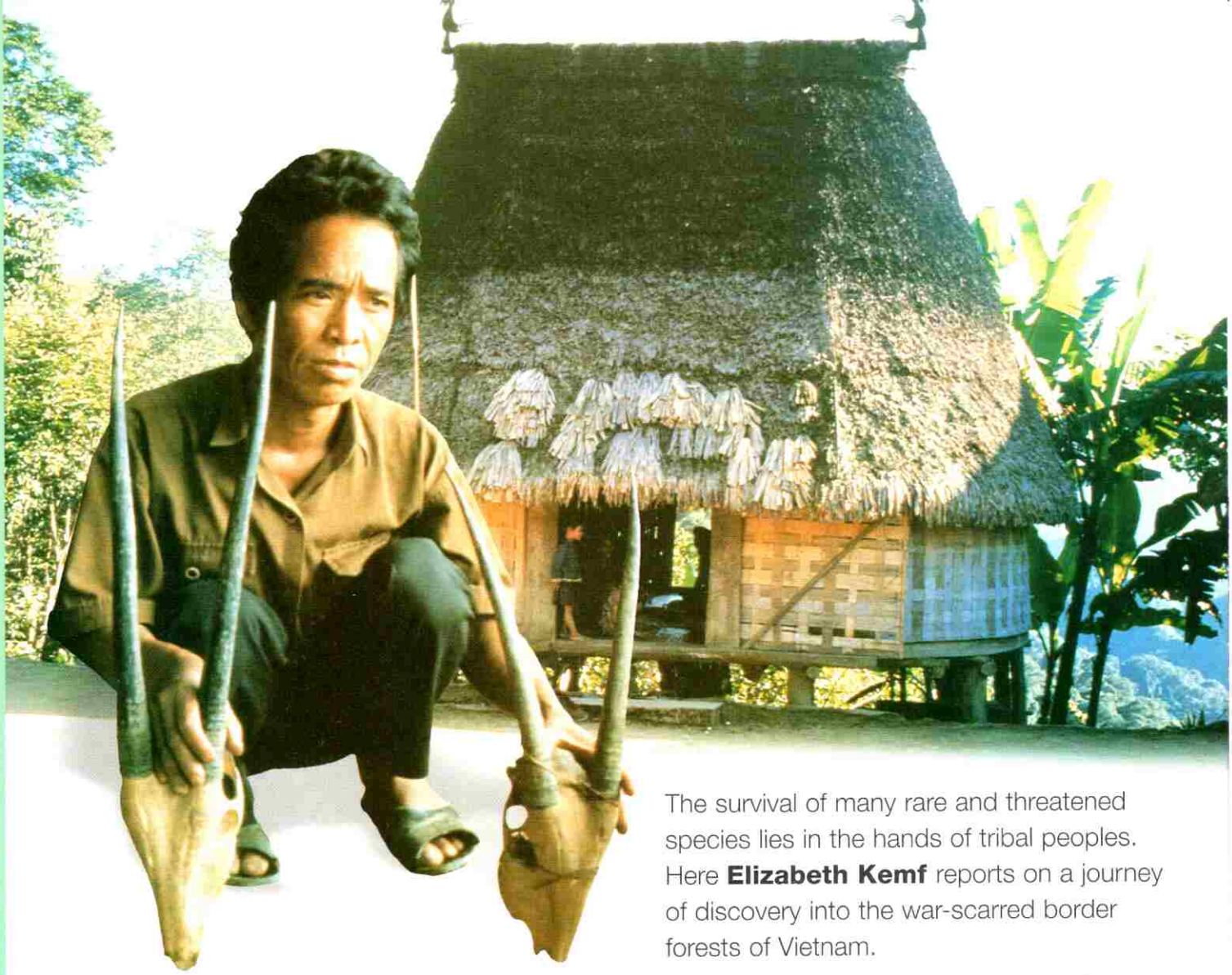
Controlled harvesting of ncema began in St Lucia during the 1960s, and today 80,000 to 120,000 kg is harvested annually. The park authorities have designated a harvest zone, covering about one-third of the ncema stand, and established a harvest season. Travelling up to 300 kms, about 1,000 people, mostly women, come to St Lucia for the ncema harvest each year.

To avoid waste, the traditional sickles which cut large clumps at a time have been banned and a special knife is given to harvesters which cuts only one rush at a time. A ticket system has also been introduced whereby a ticket must be bought for each bundle cut. This has encouraged women to be more selective in their cutting.

The park authorities are looking for ways to involve the women in the management of the ncema. Without their participation, the long term sustainable use of ncema will be difficult.

Rolf Hogan

Richy Taylor



The survival of many rare and threatened species lies in the hands of tribal peoples. Here **Elizabeth Kemf** reports on a journey of discovery into the war-scarred border forests of Vietnam.

Stalking species on the

Top: Ta Oi hunter with horns of *sao la* in front of ceremonial house
Above: Collecting forest plants for food and medicine
Right: Ca Tu chief with trophies of all three mammal species

Nguyen Van Tri Tin, or "Mr *sao la*", as he is fondly known by his colleagues, led us through "forgotten" villages in the Troung Son mountain range on the Vietnamese/Lao border. We were near the infamous Ho Chi Minh Trail, some 60 kms west of Vietnam's ancient imperial capital, Hue.

When I first visited the Ho Chi Minh trail over a decade ago I was researching the environmental effects of the war. This time I was back in the A Sau valley not far from Hamburger Hill, one of the most heavily bombed sites of the US/Vietnam war. In this valley alone, some 100,000 hectares of forest were lost when it was sprayed by Agent Orange. We were in search of some of the rarest species in the world: the elusive *sao la* and the giant muntjac. Reports were coming in from this valley that, like their northern neighbours along the Laotian border, the residents were also recording the presence of both species.

Eleven years later I wanted to see how the people and their forests were faring. To my dismay, recovery was slow and the majority of people still live at subsistence level. They hunt, fish, collect wild plants and farm to survive. After a warm reunion with people who had first welcomed me in 1987, we set off to meet more villagers of the Paco, Ta Oi and Ca Tu minority groups.

Trail blazers

The villagers were eager to follow up on the research work of the young forester, Mr *sao la*, and to show us the remains of animals which they had known for centuries but which were announced on television as being "new species". They wondered what was so special about these creatures.

In almost every house where we were invited, we were shown with great pride the skulls and horns of the *sao la*, the primitive species of bovid which captured world attention when

it was found by WWF and Vietnamese biologists in Vu Quang Nature Reserve in Ha Tinh province in 1992. The villagers also displayed giant muntjac trophies, a species of deer unknown to Western science until 1994, when hunters led survey teams to their homes near the same Nature Reserve in Ha Tinh.

It was in this province just south of Vu Quang that a rare species of bird, known in Vietnam as Vo Quy's or the Vietnam Pheasant, was rediscovered in 1990. Vo Quy's pheasant had not been seen since 1964. Even more remarkable was the rediscovery in the same year – by a group of rattan collectors – of the Imperial Pheasant, not seen in the wild in 70 years.

All these findings were confirmed by Vietnamese biologists and NGOs such as WWF and BirdLife International, but the true trail blazers are the villagers themselves, mainly members of indigenous or minority groups whose lives have depended on hunting and fishing these so-called new species. In 1996, a new fish species was also named to science in Vu Quang.

In 1997 the world was astounded again: a team of scientists including WWF researchers discovered in the homes of the Ca Tu people of Western Quang Nam province an unknown species of muntjac, about half the size of the common muntjac. At 15 kilos it is the smallest muntjac known to science, but to the Ca Tu people it has been known for centuries as *sam soi cacoong*, or "the deer that lives in the deep, thick forest".

Now, having confirmed, in our expedition to the A Sau valley, the wide distribution not only of the *sao la* but, for the first time, of the giant muntjac, we formed a small team to travel south into the western Quang Nam province. Guided by Ca Tu villagers, we were astonished to find the skulls and horns of six *sao la*, several giant muntjacs and over 30 *Truong Son* muntjacs in just one tribal house.

Inside a single oval-shaped ceremonial lodge of a Ca Tu village chief we found the high reaching roof decorated with over 400 animal skulls, horns, jaws and feathers, some of which were ornately painted in colours made from the dye of local plants. That confirmation of the distribution of all three species so far south of Vu Quang caused us to pause – and realise once again that without the full co-operation and benefit to long-term residents in such areas progress would be extremely slow, if not impossible.

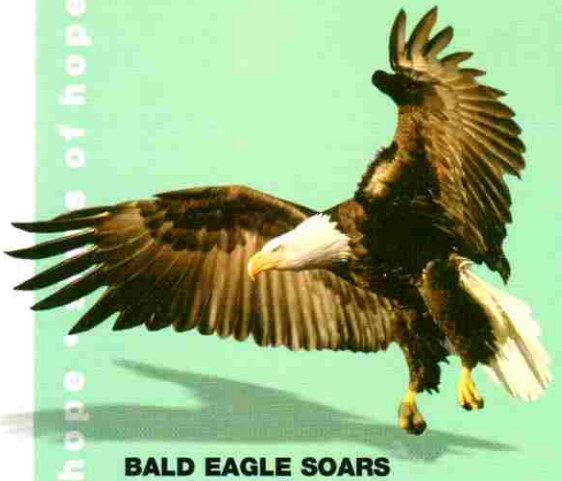
Such co-operation has already been encouraged by WWF which provided seed money first to the Thua Thien Hue Forestry Protection Department. Starting in 1996 the departments and sub departments began to post simple drawings of the *sao la* in schools, community centres and the market place asking villagers to help them find and protect wild *sao la*, and to stop hunting them. The villagers, with their own refined systems of traditional knowledge offered to help.

All Photos: Elizabeth Kemf/WWF

Ho Chi Minh trail

Huge sacrifice

In late May of this year, the dedicated efforts of the young and dynamic Forestry Protection Department paid off. Three young boys, the eldest 16 years of age, were on a hunting expedition with their dogs when they found a live



Thomas D. Mangelsen/Still Pictures

BALD EAGLE SOARS

The bald eagle, declared an endangered species in 1967, has made a tremendous comeback. From fewer than 450 nesting pairs in the early 1960s, populations now exceed more than 5,000 nesting pairs and the bird has been removed from the US endangered list.

Adopted as the national symbol of the United States in 1782, the bald eagle with a wing span of up to eight feet is unique to North America.

The greatest threat to the bald eagle's existence arose from the widespread use of DDT after the Second World War. DDT was sprayed on croplands throughout the country and its residue contaminated the food chain. The chemical interfered with the bald eagle's ability to develop strong eggshells by blocking the production of calcium. As a result, the eggshells of bald eagles (and many other birds) were so thin that when adults incubated the eggs they were crushed under the weight of the birds, or otherwise failed to hatch.

Their reproduction disrupted, bald eagle populations plummeted to near zero. As the dangers of DDT became known, in large part due to Rachel Carson's famous book *Silent Spring*, this chemical was banned for most uses in the US in 1972.

In a major effort to increase the population of eagles, the US Fish and Wildlife Service assembled the largest colony of breeding bald eagles in captivity at its Wildlife Research Center in Patuxent, Maryland, with the aim of returning healthy eagles to the wild. The captive-hatched bald eagles were an important source for restocking wild populations in certain areas of the country and helped re-establish a broader distribution.

Maya Pastakia

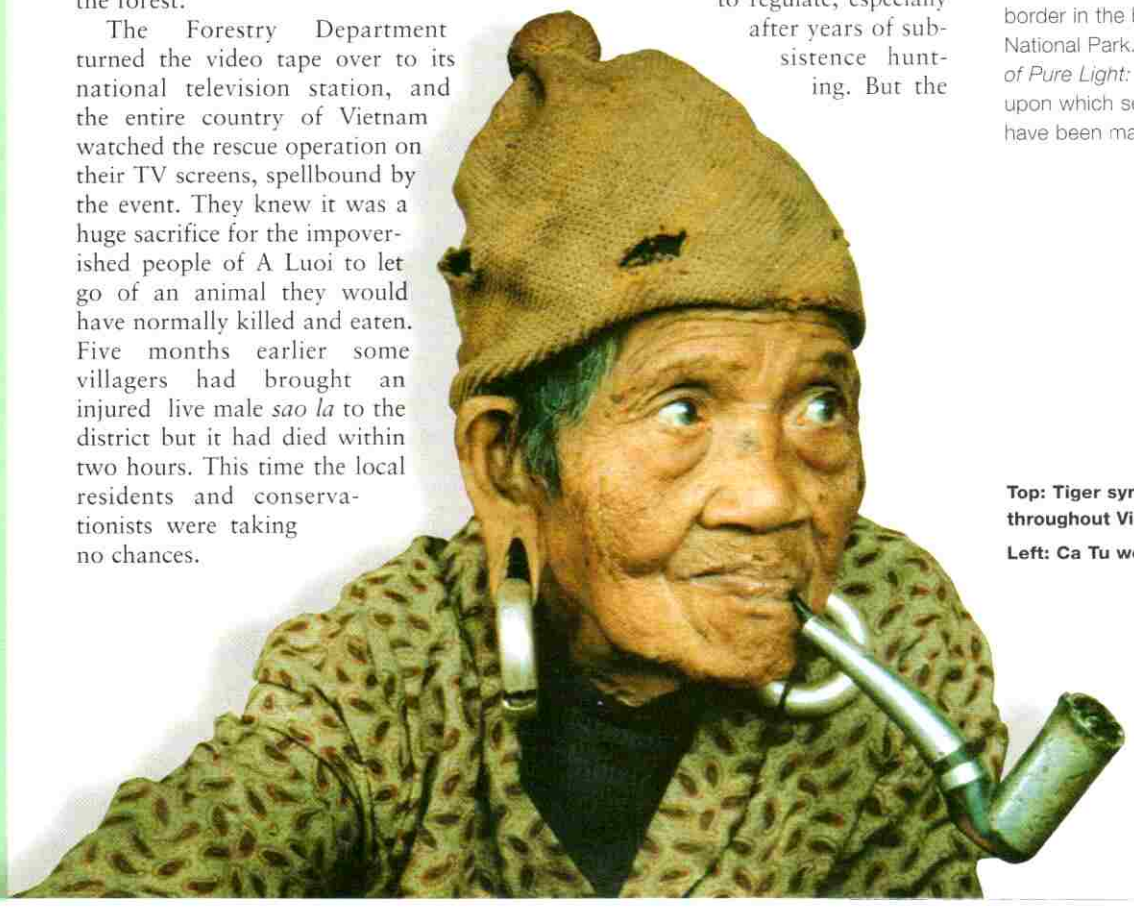
sao la, around four hours walk from the district we had visited in December. The youngsters alerted the Forestry officials and immediately "Mr *sao la*" rushed off with them to find the animal trapped in a ravine accessible only along a slippery ridge wedged inside a deep evergreen forest. Within hours, a team of scientists, again led by the Ta Oi youth who had found the animal, joined forces to record on film for the first time ever a *sao la* in the wild – and to release the pregnant female back into the forest.

The Forestry Department turned the video tape over to its national television station, and the entire country of Vietnam watched the rescue operation on their TV screens, spellbound by the event. They knew it was a huge sacrifice for the impoverished people of A Luoi to let go of an animal they would have normally killed and eaten. Five months earlier some villagers had brought an injured live male *sao la* to the district but it had died within two hours. This time the local residents and conservationists were taking no chances.

"I wish everyone would think like these people and like us and set the *sao la* or other animals like this free. I wish they would protect the forest where it lives...and I wish the people had enough food and better conditions so they would not have to hunt it for survival," said Hoang Ngoc Khanh, Chief of the Thua Thien Hue Forestry Control Department.

Whether or not Khanh's dream will come true remains to be seen. Killing of the rare species, although forbidden, is extremely difficult to regulate, especially after years of subsistence hunting. But the release this past May, rather than the death, of the female *sao la* soon to bear a calf signals hope: the children of the *Truong son* range took the future of the *sao la* into their hands, and this is where its survival lies. More than 20 years after the end of the Vietnam war, return to the Ho Chi Minh Trail revealed that although recovery is slow, there is some promise. ■

Elizabeth Kemf, Species Policy Officer at WWF International, is working with indigenous groups on the Cambodian/Vietnam border in the buffer zone of Yok Don National Park. She is the author of *Month of Pure Light: the regreening of Vietnam*, upon which several documentary films have been made.



Top: Tiger symbols appear in temples throughout Vietnam

Left: Ca Tu woman

IS THIS CONVENTION A LOST CAUSE?

On December 19, 1993, the Convention on Biological Diversity came into force. It was heralded as the most important step yet on the road to sustainable development. Earlier this year the fourth meeting of the Parties to the Convention met in Bratislava, Slovakia. Bogged down in complex detail, and deeply divided, the meeting met with little more than a yawn from Press and public. So what has been achieved and what can be hoped for? **Niall Watson** makes a personal assessment.

On the face of it the Biodiversity Convention has not produced much of an improvement in the state of the world's biological diversity:

- Rainforest destruction has continued since 1992 at the rate of one per cent a year.
- According to IUCN, one in eight of the world's plants are on the point of extinction.
- About half of the world's wetlands have been lost.
- In the European Union over 314 million tons of pesticide are used annually – almost certainly the chief cause of the sharp decline in many bird and invertebrate species.

One could go on, and on...

And yet, no real assessment of what changes the Convention has brought about has been made. Through the Global Environment Facility, for example, the Convention has already put over US$600 million directly into biodiversity projects in developing countries. Not nearly enough, but not insignificant.

The Convention is a massive undertaking: nothing less than an attempt to conserve all life on earth – not just single species, but everything from soil micro-organisms to the entire ecosystem. It is having to confront at every level everything from the exploitation of genetic resources to the forces of globalisation and international trade.

It is having to be a guardian for indigenous peoples and the poorest communities, many of whom rely heavily on biodiversity for their needs.

The scope of the Convention is at once its strength and its weakness. Among its 170 parties it is often seen as a threat to the economic aspirations of countries in the North and South. Its work is, inevitably, highly politicised.

Take forests, home to between 50-90 per cent of all land species. Countries with substantial forests or forestry industries have blocked progress in this area, using the parallel discussions over a Forestry Convention as their excuse.

Or science. Nobody knows just how much biodiversity we can afford to lose before the ecological processes on which all human life depends – clean water, soil fertility, climate regulation and even the pollination of crops – will collapse. More certainty would add impetus to action.

However, it would be a mistake to believe that the Convention has achieved nothing. Though it does not lend itself to media-friendly targets like other international treaties, it forms overall goals and policies which create a mandate for important work to be done, and a lever for activists to press. Its success in requiring countries to put national biodiversity strategies in place is a major step forward.

This year's Conference of the Parties moved ahead on various fronts, each requiring significant work at a national level. For instance, important programmes on marine and coastal ecosystems, agricultural biodiversity and inland waters and forests were further developed.

There is clearly a need for the Convention to adopt a more strategic approach to its work, with clear time frames, targets and assessments. It also needs more muscle on the international stage. More muscle means more political will. And that requires better public education and awareness – something which its supporters are struggling to secure.

Niall Watson is Biodiversity Policy Officer at the World Wide Fund for Nature in the United Kingdom.

BUTTERFLIES TO THE RESCUE

The future of one of Africa's most important forests for bird conservation seems to have been assured — by butterflies.

Arabuko Sokoke Forest, on the northern coast of Kenya, was under threat from the surrounding land-hungry residents who, denied access and frustrated by wildlife crop raiding, wanted it cleared and turned over for farming.

Then an imaginative scheme developed by the East Africa Natural History Society and the National Museums of Kenya, decided to build on the demand for tropical butterflies for the live butterfly exhibit industry in Europe and America.

Ian Exton/WWF-UK

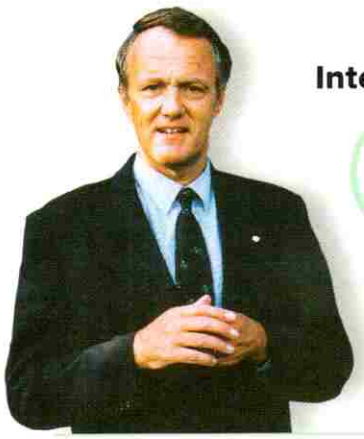
With a small grant from the Global Environment Facility, a baseline survey of the forest butterflies was undertaken, butterfly host plants introduced, breeding techniques developed and marketing arrangements made.

The result has been startling. The number of pupae exported has quadrupled since 1994 and earnings for the local community have kept pace. Cumulative earnings for the community now top $100,000 and butterfly exports make up 73 per cent of farmers' cash income from farm products.

The numbers wanting to save at least part of the forest have gone up from 14 to 84 per cent. And the wild butterfly population remains as plentiful as ever.

"The Kipepeo Project has shown that a cottage industry can be harnessed to wider social goals such as poverty alleviation and environmental protection" said Dr Ian Gordon, one of the two project leaders.

Dr Gordon may be contacted at: Kipepeo Project, Gede Ruins, Box 57, Kilifi, Coast Province, Kenya. Tel/Fax: (+254 122) 32380, Email kipepeo@africaonline.co.ke or visit the Habitat database at: www.bestpractices.org



Interview: Dr John Hanks

Creating peace parks in Africa

Later this year, a vision first dreamt by Dr Anton Rupert (now Executive Director of WWF-South Africa) becomes reality when Kgalagadi Transfrontier Park opens as southern Africa's first peace park. Here, **Caroline Wheal**, asks Dr John Hanks, Executive Director of the Peace Parks Foundation (PPF), a non-profit organisation founded in 1997, about the Foundation's plans to promote transfrontier conservation areas throughout southern Africa.

Caroline Wheal: *For the record, Dr Hanks, what exactly is a peace park?*

John Hanks: When you have two or more conservation areas coming together at an international boundary, and the boundary is open so that animals and people can move freely across the boundary, then you have to have peace or co-operation between the two countries, hence the name "peace park." It's a name that was coined by the World Conservation Union (IUCN) in about 1985. We've adopted the name and we use it to describe the work we're doing here in southern Africa.

CW: *How is land for potential peace parks in southern Africa identified?*

JH: That's an important question because I must stress that we are not an implementing agency, nor do we say where the peace parks should be. We do not actually run parks. All the peace parks that we're operating on were determined by the conservation agencies within South Africa and the neighbouring countries we're working with. We are working with three conservation agencies to fund and facilitate this process. The conservation agencies come to us and say, "Here is a peace park that we want to establish, would you help in terms of getting the thing going?" Our job at PPF is to fund and facilitate the process whereby it comes about.

CW: *What are the benefits to Southern Africa of a transfrontier conservation area (TFCA) over a national one?*

JH: When we started, we used three main arguments to sum up why this is a very important initiative for southern Africa. The first is the role that these areas can play in job creation. Tourism is the one industry with the potential to bring about the economic transformation of southern Africa – not just South Africa. If you look at the figures for South Africa at present, tourism contributes four per cent to the GDP. If it can get up to 10 per cent, which I believe it can, that is some two million new jobs created. In addition, it will bring in some 40 billion rand [about £4 billion] per year. There's no other industry that can come anywhere near that in terms of potential for growth – and a lot of that growth is going to be in nature-based tourism.

The second reason why peace parks are crucial is in terms of conserving biological diversity. One of the best examples is the [proposed] linking of Kruger National Park [in South Africa] with corresponding areas in Mozambique and Zimbabwe. This will help to re-establish traditional elephant migration routes that were cut off when the fence was built to the east of the Kruger National Park in 1976 and elephant culling will no longer be necessary in the park. Similarly, it will contribute greatly in terms of conserving species that move over large distances, such as the wild dog, one of the most threatened species in Africa – down to about 3,000 – and the cheetah, also highly threatened – down to about 11,500. There are other areas in Maputaland [on South Africa's east coast] that are one of Africa's biodiversity epicentres. It contains an exceptionally high number of species of fauna and flora, and is a zone of sharp transition, representing the southern most extent of the east African fauna and flora, and the northern most extent of many of the southern African species. It also contains many endemics spread over the whole taxonomic spectrum.

The third leg is the importance of peace parks in promoting regional peace and co-operation. It's quite unique. A classic example is the linking of the Kruger National Park with an area in Mozambique, which is at present a hunting area; two national parks in Mozambique; a national park in Zimbabwe and an area between of

Peace Parks Foundation

communal land [to form the Kruger/Banhine-Zinave/Gonarezhou TFCA]. That's an area of 95,000 km² – 2,000 km² larger than Portugal – a huge, new transfrontier conservation area. Kruger alone, today, gets over 800,000 visitors. When the peace park opens, there are going to be huge opportunities for new roads, new construction, new lodges, new jobs in this vast area of Mozambique, where at present nobody's in the cash economy.

CW: *What will happen to the people living in areas earmarked for the peace park?*

JH: Well, very few people are there at present. But we stress that there's no hint of anyone being moved from these areas. That's the old-fashioned way of doing it. So, for people who want to continue living along the Limpopo, their arable lands will be fenced and they'll be allowed to stay. However, we hope that they will move into the economy associated with tourism, come into the cash economy and not have to subsist.

CW: *Are local communities, for the most part, buying into this idea?*

JH: It's early days. One of the most important projects that we're funding is a community-based project around Zinave National Park [in Mozambique] to look at how we can get local communities involved in the tourism industry so that they benefit from it and become genuine partners. This, I think, is one of the greatest challenges we face in Africa: How do we get benefits of tourism back to local people? This leakage of foreign currency is an Africa-wide problem. If you look at a package tour from England to Kenya, probably 60 to 70 per cent of the money paid in England stays in England. And how much of the money that actually makes it to Kenya is benefiting someone in Nairobi, say, rather than going to local people? How do we reverse that? How do we make local people genuine equity partners? I think if we can come up with new approaches and new ideas for doing that, it's going to be exciting. We're putting together quite an inter-

CHAMELEON'S LUCK

The Cape dwarf chameleon *(Bradypodion pumilum)* once common in the wine-growing region of Stellenbosch, South Africa, has plummeted in numbers due to the use of modern pesticides and mechanical harvesting techniques. Harvesting machines strip numerous chameleons from the vines, while others are pulped along with the grapes in mechanical crushers.

Now, however, its luck has changed due to enterprising winemaker, Gary Jordan, owner of the Jordan winery near Cape Town. "Once we realised there were so many chameleons in our vineyards, we wanted to preserve them. They are nature's own pest controllers." The chameleon once regarded as an evil omen by local farm workers feeds only on vine bugs and flies.

Drew Gardner

"All our picking is done by hand, and if we have to spray any pesticides, we do it in winter, when there are no leaves on the vines and we can see where the chameleons are."

The chameleons have become celebrities and visitors to the vineyard don't just sample the wines but also engage in a bit of chameleon-spotting.

Supporters of the South African Chameleon society are also helping to restore the reptile's fortune by offering to collect and remove them from vineyards where they are still regarded as pests. The National Parks Board has granted permission for the reptiles to be released in some of its parks, where they are tourist attractions.

Source: The Sunday Telegraph (UK), April 1998.

esting team of people to work in and around these areas.

CW: *How will you prevent most foreign currency being funnelled into one or two private luxury game lodges?*

JH: It's not up to us to say what kind of development will take place in peace parks. But there's a growing realisation that we've got to come up with new ways of funding the continued management of protected areas. State subsidies are being cut; most governments in Africa simply don't have the money to run huge national parks. The international agencies are not going to come up with the amount of money required. So what do you do? How do you make sure they're managed sustainably without human encroachment taking place? The only way is by generating money, which you can do by using the resources within this area – such as some consumptive form of wildlife utilisation – or you can encourage non-consumptive tourism.

The challenge is to get entrepreneurial expertise into these areas, not to have governments running them. So to the private sector I say, "Come and invest in these areas, build lodges, run lodges in co-operation with communities." If we don't go that way, we're not going to get it right.

CW: *Will there be some kind of international parks board running the peace parks?*

JH: No. This is another important point. The very first peace park to be opened is the Kgalagadi Transfrontier Park, which links the Kalahari Gemsbok National Park [South Africa] with the Gemsbok National Park across the border [Botswana]. This is a classic example of how a peace park is going to work. For this large area of 37,991 km^2, there's a joint management plan that was drawn up many years before PPF came into being. The Botswanan side and the South African side got together and agreed how wildlife will be managed, how roads are going to be put in, on legal aspects – everything to do with running a park like this. The important thing is that the South African side will be run by South Africa; the Botswanan side by Botswana. So each side retains sovereignty and responsibility, within a common system. The great advantage is that you can share resources, so if a road has to be built here, equipment such as graders can be shared. If you need a survey done, it's daft to stop at an artificial boundary, so you use the same research team to do the whole survey. You share revenue that's received, and so on. There are all sorts of financial advantages.

CW: *Speaking of finances, how is PPF funded?*

JH: Initially we're looking for 1,000 individuals and 100 companies to become founder members, and then we want to grow it out from there. We're approaching the bilateral and multilateral aid agencies, trusts and foundations worldwide. Most of our support comes from outside Africa. Our target is US$50 million for the next three years to finance a "shopping list" drawn up by the various agencies.

CW: *What does membership cost?*

JH: For an individual, it's a $5,000 one-off payment; for a corporation, it's $50,000 for membership for 10 years.

CW: *And what's the response been like?*

JH: Incredibly encouraging...I really am delighted by it. What's so encouraging to me is that when I give a lecture on peace parks, so many people come up and say, "We'd like to be associated with it, what can we do, how can we get involved?" I think we are uniquely placed as a not-for-profit organisation, having the level of support that we do. Our challenge now is to get out and show people that the funds they've put in are going to be used for worthwhile projects, and then to really go after some serious funding.

CW: *Will entry fees into peace parks be a little higher than current national parks fees?*

JH: Again, that's up to the responsibility of conservation agencies to decide. I think it's a pity if you price locals out of existence. Personally, I think it's still unbelievably cheap to get into a park here. You know, if you go to a historic home in Britain, you pay £5 to get in – about R50. An overseas visitor will think nothing of paying that to get into one of our beautiful nature reserves.

CW: *What sorts of jobs do you envisage for local people within and around peace parks?*

JH: Everything to do with running and managing a large conservation area. There are very few people working in the field in Mozambique's national parks now. A key to getting people there is capacity-building and training, which is where the Southern African Wildlife College comes in. This is a place on the edge of the Kruger to train the wardens and rangers from neighbouring countries. Just putting infrastructure into a park – wardens, rangers, game scouts, road-maintenance staff...

CW: *...anti-poaching squads...*

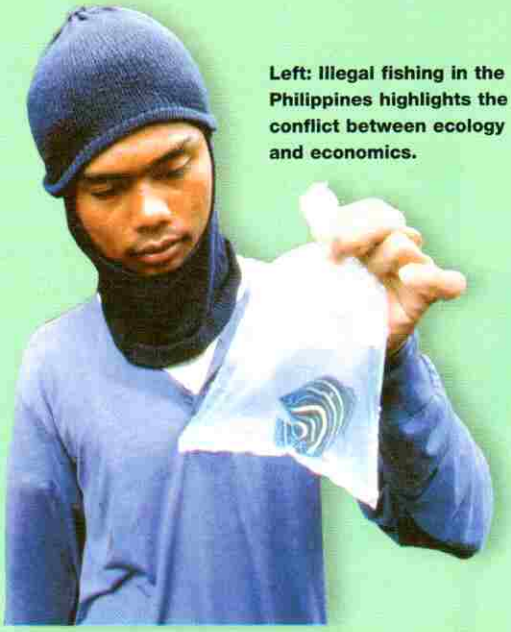
JH: Everything to do with running a park. But then, when the private sector comes in and develops lodges, then anything to do with running and servicing a lodge, from cooks to maintenance staff, to laundry workers, to people growing vegetables and providing food, taxi drivers...it goes right across the spectrum. Whole little industries will spring up; there's a tremendous ripple effect. There are people who make and sell things...there are lots of informal traders who grow up around the tourist trade, and that will also be encouraged. ■

Caroline Wheal is *People & the Planet* correspondent in South Africa.

Nigel J. Dennis/Still Pictures

Stopping the whirlpool

How can the Great Extinction be stopped? Only by influencing people at every level, says **Jean Pierre d'Huart.**



Left: Illegal fishing in the Philippines highlights the conflict between ecology and economics.

Alberto Garcia/Christian Aid/Still Pictures

Crude statistics should make our heads spin. The IUCN Red Lists indicate that 25 per cent of mammals, 11 per cent of birds, 20 per cent of reptiles, 25 per cent of amphibians, 33 per cent of freshwater fish and 12.5 per cent of plants are threatened with global extinction. So many species going down the drain, and no one able to give a straight answer to the question: what can *really* make a difference?

While conservationists are rightly alarmed by the progressive damage to ecological processes, things keep going on as if the rest of the world was not greatly disturbed by the ongoing catastrophe. The widening rift between the kind of environmental management needed to reverse this trend and the way people actually deal with the resources of this planet is frightening.

Minds and hearts

What worries most about this apparent apathy is the unfulfilled commitment of governments to tackle seriously the of loss of biodiversity and to lead their people towards a greater respect for nature.

Despite this, one can confidently assume that on an individual basis, most people would affirm their love for plants and animals and their support for the conservation of natural habitats. But of course, the reasons given for this support and the conditions attached to it would differ greatly and make it impossible to achieve a consensus on a universal approach to the problem. This is why most of us have now realised that lasting conservation successes cannot be realised without public support and full understanding of each others motivation and constraints.

What moves people to protect bits of nature is a matter of what they have in their minds, what they keep in their hearts, and what they want in their pocket. Depending on their level of well-being, cultural background and education, the complex cocktail of their motivations will determine behaviour ranging all the way from ultra-protectionism to overt destructiveness.

The hearts of millions of people constitute the main filter through which they will determine the value (both for themselves and for other people) of preserving flora and fauna. Selected plants, animals and natural sites therefore take on a particular importance locally because of people's faith, tradition and other socio-cultural values. Unfortunately, sacred groves, revered species and wilderness sanctuaries are also victims of social changes and unsound development schemes.

While people in developing countries have no choice but to look for the best compromise between these values and their aspiration for a better life, people in rich countries are not inclined to give up their damaging consumption habits, but still want to enjoy all the benefits of wild species and wild spaces. The negative effects of both situations are amplified by the rate of population growth and the volume of resources consumption.

Money talks loud. Even if companies, banks and governments claim to be "environmentally conscious" in their respective businesses, the ever-increasing proportion of degraded forest, wetland and coastal areas, with their associated cohort of wild species, are the silent witnesses of many of their ill-conceived production systems, fiscal incentives or legislations. If people's heart is a primary reflection of their motivation to conserve nature, people's wallet seems to take precedence in many instances. Rich or poor, the need for more money pushes a considerable number of people to participate in the continuing impoverishment of species.

The right message

Where is the way out? How can this destructive whirlpool be stopped? Both vast scale advocacy work, aimed for example at pushing governments to implement the Convention on Biological Diversity, and small scale integrated interventions, aimed at convincing the local fishing village to shift from dynamite to a sustainable alternative, is probably the answer.

At the end of the day, choices are made by men and women whose decisions are very much influenced by peer pressure. Since it is so difficult to alter the value of what individuals want to keep in their hearts and put in their pockets, the best alternative is to influence their communities through education, awareness-raising and lobbying. The challenge is to adapt the right message to the right audience. ■

Dr Jean Pierre d'Huart was formerly Manager of the Species Unit at WWF International. He is now Programme Director at WWF Belgium.

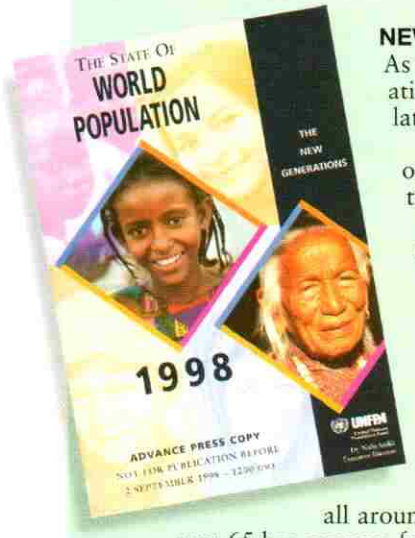
A prayer for the planet

by the Duke of Edinburgh, President Emeritus of the World Wide Fund for Nature.

Lord, the Creator of the universe and author of the laws of the nature, inspire in us thy servants the will to ensure the survival of all the species of animals and plants, which You have given to share this planet with us. Help us to understand that we have a responsibility for them and that "having dominion" does not mean that you have given us the right to exploit the living world without thought for the consequences. Through Him who taught us that Solomon in all his glory could not compare with the beauty of the flowers of the field.

This prayer was written by Prince Philip as a contribution to *Favourite Prayers*, Cassell, London, 1998, £9.99.

Associates' news



NEW GENERATIONS

As the momentum of global population slows, the balance of numbers between the generations is changing, throwing up new challenges for the policy-makers, according to the latest *State of World Population* report from the UNFPA.

On the one hand, high fertility of the past means that more young people than ever – over 1 billion between 15 and 24 – are entering their childbearing years. On the other, the numbers over the age of 65 are growing fast.

"As the largest-ever young generation comes of age," the report says "society's obligation to address their educational and health needs, and to promote their human rights is both a moral and a practical imperative."

In terms of reproductive health, "services must address adolescents and their sexuality openly and honestly, provide more options, sensitive counselling and better information to promote effective use of the most effective means of contraception." At present up to three-quarters of pregnancies among young unmarried women are unwanted.

Increasing the age of marriage would also go a long way to slow down population growth, the report says. Raising mothers' age at first birth from 18 to 23 would reduce population momentum by 40 per cent.

The gradual shift to an older population over the next few decades is taking place all around the world. This is particularly striking in the developed world where the proportion over 65 has gone up from 8 per cent to 14 per cent since 1950 and is expected to reach 25 per cent by 2050. In Japan, Germany and Italy it will approach 40 per cent. Even in Africa, the number of over 65s is expected to nearly triple by 2025.

Meanwhile world population will continue to grow towards 8, 10 or 12 billion, depending on what countries do in the coming decades. If the financial shortfall for reproductive health and population programmes persists, the report warns, each year there will be millions of unintended or unwanted pregnancies, abortions, and unintended births, tens of thousands of additional maternal deaths, and at least a million more infant and child deaths.

Contact: UNFPA, 220 East 42nd Street, New York, NY 10017, USA. Tel: (+1 212) 297 5020, Fax: (+1 212) 557 6416, Email: ryan@unfpa.org Website: www.unfpa.org

DEADLY DDT

While banned decades ago in industrialised countries, thousands of tons of the pesticide DDT are still used each year, mainly to fight malaria. Now the World Wide Fund for Nature (WWF) is calling for DDT to be phased out of use by 2007.

It notes in a report, *Resolving the DDT Dilemma*, that DDT is linked to irreparable harm in animals and humans such as cancer, reduced lactation and reproductive problems. About 35,000 metric tons of DDT are produced each year in at least five countries and it is legally imported and used in dozens, including Mexico.

Because DDT can travel long distances and accumulate in the body, millions of humans and animals worldwide have traces of the chemical in their tissue, even though it may have been produced on another continent. Researchers have found that black-footed albatrosses on Midway Island – 3,100 miles from Los Angeles and 2,400 miles from Tokyo – have high levels of DDT, as well as PCBs and dioxins. Further studies have linked DDT to feminisation and altered sex-ratios of gulls, and eggshell thinning in birds of prey.

Mike Jackson/Still Pictures

DDT is the poster child for long-range persistent chemicals because even though it was banned decades ago in many countries, it can still be found in high concentrations across the globe," says Clifton Curtis, Director of WWF-US Global Toxics Program. "As our report shows, it is possible to completely ban DDT and to work to eradicate malaria in ways that protect the environment."

WWF studied a range of insect-borne disease control programmes in Africa, India, the Philippines, South America and Mexico. A variety of alternative techniques proved to be effective and financially feasible, including pesticide-impregnated bednets (reducing the need for airborne interior spraying); odour-baited cloth targets to attract and destroy disease-carrying insects; lower-risk pesticides used in rotation to avoid the development of resistance; and widespread elimination of mosquito breeding grounds and introduction of natural predators and sterile insects.

The report was released earlier this year as nations gathered in Montreal to begin a two-year process designed to ban 12 of the most dangerous persistent organic pollutants, including DDT and to develop criteria for banning other chemicals determined to pose unacceptable risks to human health and the environment.

For a copy of the report contact:
Judi Levita, WWF-Canada,
90 Eglinton Avenue East, Suite 504,
Toronto, Ontario M4P 2Z7, Canada.
Tel: (+1 416) 587 2951, Fax: (+1 416) 489 3611,
Email: jlevita@wwfcanada.org

PLANTS IN PERIL

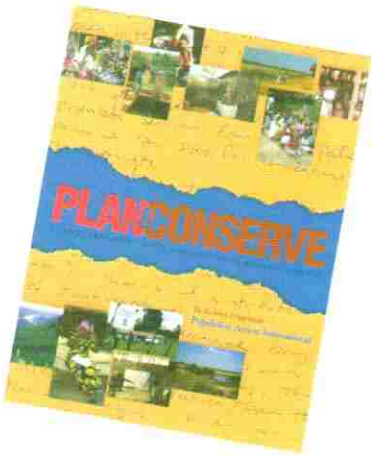
Disappearing plants and the global threat to biodiversity is the theme of the latest issue of World Conservation, the quarterly bulletin of the World Conservation Union (IUCN).

Two dozen plant specialists from the wider IUCN network take readers

on a journey around the world and through the Plant Kingdom to make their case: plant conservation has been neglected for too long, and the resulting threat to ecosystems and to human livelihoods and economies is real.

The IUCN Red List of Threatened Plants, issued last April, sounded the general alarm: some 12.5 per cent of the world's plant species are now threatened. One of the plants highlighted in the Red List launch is shown on the cover, in a magnificent photo by J. Donaldson of the South Africa's Wood's cycad, extinct in the wild yet nurtured in botanic gardens.

Contact: IUCN (see page 35)



PLAN AND CONSERVE

The idea of providing reproductive health services alongside improvements in the local environment seems simple enough. Improving the health of people and their natural resources, while easing demographic pressures would seem to make very good sense. Unfortunately, it has not been very widely tried, and is poorly documented.

In an attempt to rectify this, Robert Engelman of Population Action International has produced a long-awaited source-book on community projects which have attempted to make these linkages.

He has tracked down 42 projects, several of them carried out by World Neighbours and CARE, and explored some of the difficulties and rewards in attempting to square this particular circle.

Among his conclusions is that the linking of services for reproductive health and nature conservation is feasible and that some projects have been in operation for years. The Orangi Project in Karachi (linking sanitation and women's gardening work with family planning) and the Baudha-Bahunipati Family Welfare Project in Nepal (involving fodder trees, water supply, animal breeding and other activities with reproductive health services) are two of the better known examples.

Engelman also found that successful examples built on the expressed needs of local people without imposing an outside demographic agenda, and put a special focus on the wellbeing of women and their capacity for self-expression. He also concluded that there are multiple models of community-based work to draw from.

For a copy of *Plan and Conserve* contact:
PAI, 1120 19th Street NW,
Washington DC 20036,USA.
Tel: (+1 202) 659 1833 Fax: (+1 202) 293 179
Website: www.populationaction.org

NEW PATHWAYS

Pathfinder International has formed the Pathfinder Fund International, based in London, England. This new charity will join forces with European organisations to expand access to quality reproductive health services throughout the developing world.

Pathfinder Fund International is headed by Dr Alberto Rizo, a highly-esteemed reproductive health practitioner and programme manager, with extensive experience throughout the world. Dr Rizo will foster links between European NGOs and Pathfinder field offices around the world.

Contact: Dr Alberto Rizo,
Pathfinder Fund International,
9 Grove Street, 320 Kensal Road, London W10 5BZ, UK.
Tel: + 44 (0)181 968 2940,
Fax: +44 (0) 181 968 0360

STRONG MESSAGE

Encouraging women to do something for their health and lives netted the Ecuadoran-IPPF affiliate APROFE an 'Honorable Mention' in the Rosa Cisneros Memorial Information Awards, resulting in a big increase in clinic attendance nationwide.

The TV spot that was part of the low-cost, national mass-media campaign shows a happy couple very much in love at an APROFE clinic. A gradual change from black and white to colour is cleverly used in this optimistic TV spot to symbolise women's empowerment. The International Planned Parenthood Federation / Western Hemisphere Region sponsors the Awards.

The APROFE campaign was developed with technical assistance from JHU/CCP's Population Communication Services project to generate demand for services, increase the number of clinic users, especially among women of middle socio-economic status and promote clinic sustainability. The campaign, launched in mid-1997, included TV and radio spots, posters, brochures and press packets.

The image of a confident woman making healthy decisions for her own wellbeing resulted in an average 30.5 per cent increase in clinic attendance four months after the campaign was launched. Even more dramatic was the 413 per cent increase observed in the Mapasingue clinic. Exit interviews with APROFE clients throughout the country revealed a big increase in the number mentioning mass media as their referral source.

Contact: Johns Hopkins University, Center for Communication Programs, 111 Market Place, Suite 310, Baltimore, Maryland 21202, USA. Tel: (+1 410) 659 6300), Fax: (+1 410) 659 6266.

POPULATION CHART

The *World Population Data Sheet* from the Population Reference Bureau continues to be one of the most valuable basic sources of reference on demographic data on all the countries of the world.

The 1998 edition, now available, has a thoughtful introductory essay on the uncertainties ahead in projecting future world population size. Tiny variations in fertility rates can have immense consequences.

Thus as the Data Sheet says, if women worldwide were to average 2.5 children, rather than two or less in the long term, world population would rise to 11.2 billion and continue to grow indefinitely passing 27 billion by 2150. If, by contrast, average family size comes down to 1.6, population growth would peak at 7.7 billion by 2050 and then go into decline.

You pays your money and takes your choice: but will the world be willing to pay for the education and health care of girls that is required?

World Population Data Sheet is available from: PRB, 1875 Connecticut Avenue NW, Suite 520, Washington DC 20009-5728, USA.
Tel: (+1 202) 483 1100.
Fax: (+1 202) 328 3937,
Email: popref@prb.org
Website: www.prb.org

Associates' News is compiled by **Maya Pastakia** *to whom all contributions should be addressed.*

Films

TRAIL OF DESTRUCTION

Partula tristis, a type of Polynesian tree snail, has very good reason to be sad. It is one of the rarest species, animal or plant, on earth. The total known global population amounts to six adults and four babies, living in a clear plastic box, on a shelf, in a small room in London's Zoological Society.

Neighbouring boxes house a selection of other equally endangered members of the Partula family. They may only be snails, and not big furry creatures commonly associated with conservation projects, but these incredibly rare specimens are lovingly tended by invertebrate specialist, Dave Clark, with the hope that one day they can be returned to their native islands of the South Pacific.

The Partula's rapid descent to the brink of oblivion is the now all-too-familiar story of clumsy human intervention in complex ecological systems, and is just one of the stories of less well known endangered species, featured in a documentary special which is currently in production for TVE's *Earth Report* series.

The story begins in the latter half of the 1960s when an entrepreneur introduced a non-native snail species, the Giant African Land Snail, to the South Pacific island of Tahiti. The intention was to farm the meaty mollusc, which can weigh up to one kilogram, as a source of food.

However the Land Snail was not a commercial or culinary success and soon proved itself to be more than a match for its would be cultivators. Inevitably, it escaped into the island surroundings. With no natural predators and a prodigious appetite for breeding and consuming the island's lush vegetation, the population boomed and the Land Snail spread to other islands in the South Pacific. Soon it became a major pest, causing serious damage to crops, especially the economically important orange crops. Exasperated islanders demanded that action be taken.

Daunted by the scale of the problem, the authorities opted for a programme of biological control, even though scientific advice warned against this course of action. On Moorea, one of the worst effected islands, they introduced a carnivorous snail, *Euglandia rosea*, a species native to Florida and Central America, which preys upon other snails and eats them whole. But the predatory snail did not prove effective against the Giant Land Snail, which was just too big to be consumed. Even the young Giants grew too quickly to be seriously threatened.

Instead, the predator turned its attention to the native snails, the Partulas, with devastating results. Much smaller and slower than the killer snail, the Partulas made an easy mouthful. Experiments showed that the voracious carnivore would happily devour at least four of the endemic snails in 24 hours. The predator spread rapidly, destroying Partula populations wherever it went. By 1987, all Partula species on the island of Moorea were declared extinct in the wild, two were later reported completely extinct.

Like the Giant Snail before, it is now being carried from island to island, and across Polynesia the pattern of extinction is being repeated. Most species of Partula are now on the Endangered List and it is only a matter of time before they are pushed into extinction.

The many species of Partula may well have disappeared unnoticed but for the fact that they are of special interest to zoologists for the study of evolution and were already being kept for scientific study. London Zoo co-ordinates an international captive breeding programme involving 18 other zoos and universities around the world, to make sure that around 33 species and sub-species of these special snails remain on the right side of extinction.

For the time being home will remain the rather spartan confines of the boxes on the shelf in London Zoo, but staff intend that one day, Partula Snails will once again be slithering over their native soils of their tropical island home.

As well as the Partula Snails, the *Earth Report Global Edition* on endangered species, will be looking at threats to bumble bees, wolves and sloth bears. The programme is currently in production and is due to air on BBC World in December 1998.

Nick Rance

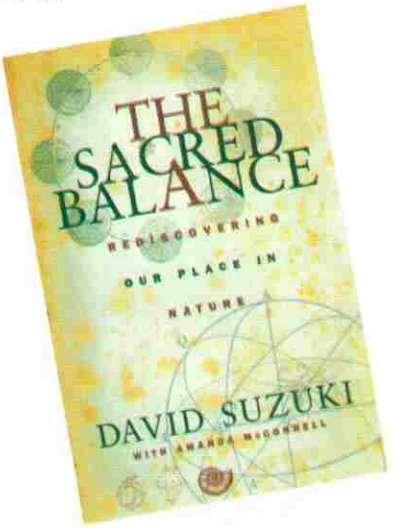
For further details of TVE programmes on endangered species and other environment and development issues contact:
The Distribution Office, TVE,
Prince Albert Road, London NW1 4RZ, UK.
Tel: + 44 (0)171 586 5526
Fax: + 44 (0)171 586 4866
Email: tve-dist@tve.org.uk

Books

NATURE AND GOD

The Sacred Balance

David Suzuki
Prometheus Books, New York, 1998,
$25-95



Among the flood of books on environment, a growing current focuses on the spiritual changes needed for us to stop our destruction of nature. The prescriptions are usually remarkably similar: recognise our unity with and interdependence with nature; shift from a Cartesian mechanistic view of reality to a holistic ecological view; control our egocentric, consumerist appetites. Of course they are no less valid for being repeated: the repetition is a sign of hope, it shows that a shift is occurring or has occurred in the dominant ideology.

This book from the geneticist and science populariser David Suzuki adds to that rising tide but goes further. Suzuki skilfully uses his science background to show just how intimately we are linked with our surroundings – how every breath we take, for example, contains billions of billions of atoms that link us not only with the respiration of every other animal and plant on earth, but also with the carbon and nitrogen cycles, with volcanoes, and with the history of the earth's climate.

He performs the same service for water – "the oceans in our veins". For energy, from the sun to cycles of adenosine triphosphate in the body; for soil; and for the diversity of living species. He ends with an (again familiar but still always useful) call to individual action and a roster of environmental success stories ranging from Kenya's Green Belt movement to Bangladesh's Grameen Bank. All this with an agreeable mix of diagrams and quotes from ancient and modern poets, philosophers and writers on religion.

The religious aspect is implicit in the book's title and in the chapter headings – 'The Divine Fire' on energy and

the sun, 'Sacred Matter' on spiritual attitudes. Suzuki argues that we need a new ethical system based on interdependence, a new acceptance of our bodily and material existence, and a new religious approach reconnecting with earth through ritual and ceremony. Yet these sections are not elaborated, and seemed much shorter than would be required in a call for restoring the sacred balance.

All along I was waiting for a mention of pantheism, which equates the universe and nature with God. Pantheism is implicit in a great deal of writing about the spiritual aspects of environment. The mention never came. But it is implicit in this book, and Suzuki is clearly a pantheist.

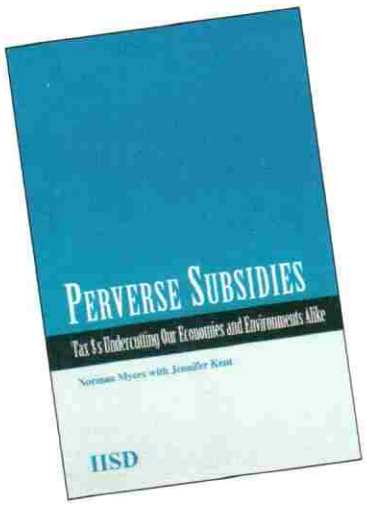
Paul Harrison

Paul Harrison is the author of *The Third Revolution* (Penguin, £6.99).

DESTRUCTIVE INCENTIVES

Perverse Subsidies: Tax $s undercutting our economies and environments alike

Norman Myers with Jennifer Kent
International Institute for Sustainable Development, Winnipeg, Canada, 1998,
Can $15.00, US$10.00 plus p&p.



Efforts to protect endangered species and their habitats worldwide are consistently undermined by incentives which reward environmentally destructive behaviour. Intuitively it would appear that reversing these incentives and providing a macro-economic framework which actively encourages the wise use of natural resources is a key challenge if sustainable development is to become reality. This book by provides much valuable information to support this aim.

Subsidies which include direct financial transfers, adjustments to market prices, tax breaks, reducing input costs or changes to the costs of complementary goods. These transfers are made to either producers or consumers and may have direct and indirect impacts on the economy and on the environment. Perverse subsidies are those which are adverse to society's interest in the long run and which damage both the economy and the environment.

Myers reviews the extent of perverse subsidies in five critical sectors of the global economy; agriculture; energy; transport; water and fisheries. For example, subsidies on agricultural chemicals result in loss of biodiversity on farms; the tax incentives for logging result in the loss of valuable wildlife habitats in forests. In the United States, gasoline is now cheaper than bottled water thanks to major subsidies, encouraging a lifestyle, settlement planning, recreation and consumption patterns predicated on extensive private car use.

Myers estimates that perverse subsidies worldwide total nearly US$1.5 trillion per year, perhaps as high as $2 trillion. This figure represents more than three times as much as the annual cash income of the 1.3 billion poorest people in the world, and it severely distorts the global GNP of $28 trillion. Furthermore, this figure is likely to be an underestimate – the full economic costs of many aspects of environmental damage are not known. Environmental externalities of road transportation alone possibly account for $1 trillion.

This book makes a significant contribution in documenting the extent of these incentives for destruction. I recommend it as a very approachable account of a complex subject. If only our key policy-makers would read it and act to remove and minimise these damaging subsidies, rather than blindly pursuing free market policies to the further detriment of people and the planet.

Katrina Brown

Katrina Brown is Senior Lecturer in Natural Resources at the School of Development Studies, and Senior Research Fellow at CSERGE (Centre for Social and Economic Research on the Global Environment), University of East Anglia, UK.

NEW FROM IUCN

The 1997 *IUCN Red List of Threatened Plants*, published this year at £30 or US$45, represents the pooled research and resources of many of the world's leading botanical and conservation organisations. The results are startling and serve as a call to arms for conservationists around the world.

The most comprehensive compilation of data on threatened vascular plants ever published, it includes names of some 33,000 plant species determined to be rare or threatened on a world scale.

Compiled by the World Conservation Monitoring Centre (WCMC), it is the result of 30 years' data-gathering.

Catalogue

To mark IUCN's 50th anniversary, the *World Conservation Bookstore Catalogue* celebrates 50 years of environmental publishing.

This is a compilation of titles available from: CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), IUCN (the World Conservation Union), the Ramsar Convention on Wetlands, TRAFFIC (the joint wildlife trade monitoring programme of IUCN and WWF), and WCMC.

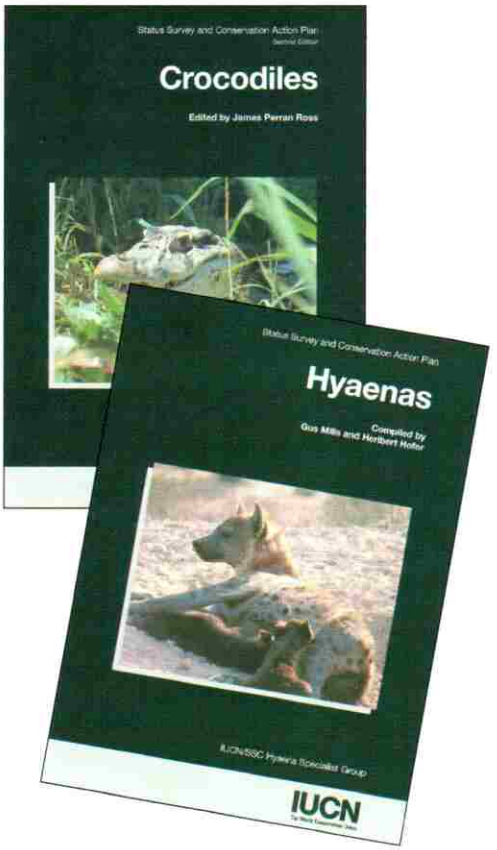
Subjects include: biodiversity, economics of biodiversity, ecosystems, education, environmental management, forest conservation, information resources, international conventions, environmental law, marine and coastal areas, world heritage, protected areas, species conservation, wetlands, and wildlife trade monitoring.

Also available

The *Status Survey and Conservation Action Plans of the IUCN Species Survival Commission*, represent the best assessment of international conservation priorities for groups of species.

Recent titles include: *African Wild Dog* (IUCN/SSC, 1997), *Asian Rhinos* (IUCN/SSC, 1997), *Cactus and Succulent Plants* (IUCN/SSC 1997); *Crocodiles* (IUCN/SSC, 1998 2nd edn), *Deer* (IUCN/SSC, 1998), *Ethiopian Wolf* (IUCN/SSC, 1997) and *Hyaenas* (IUCN/SSC, 1998).

Many are also available on the SSC Website at: *www.iucn.org/themes/species* or *www.iucn.org/themes/species*



Contact: IUCN Publications Services Unit, 219c Huntingdon Road, Cambridge CB3 0DL, UK. Tel: +44 (0)1223 277894, Fax: +44 (0)1223 277175,
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People & the Planet

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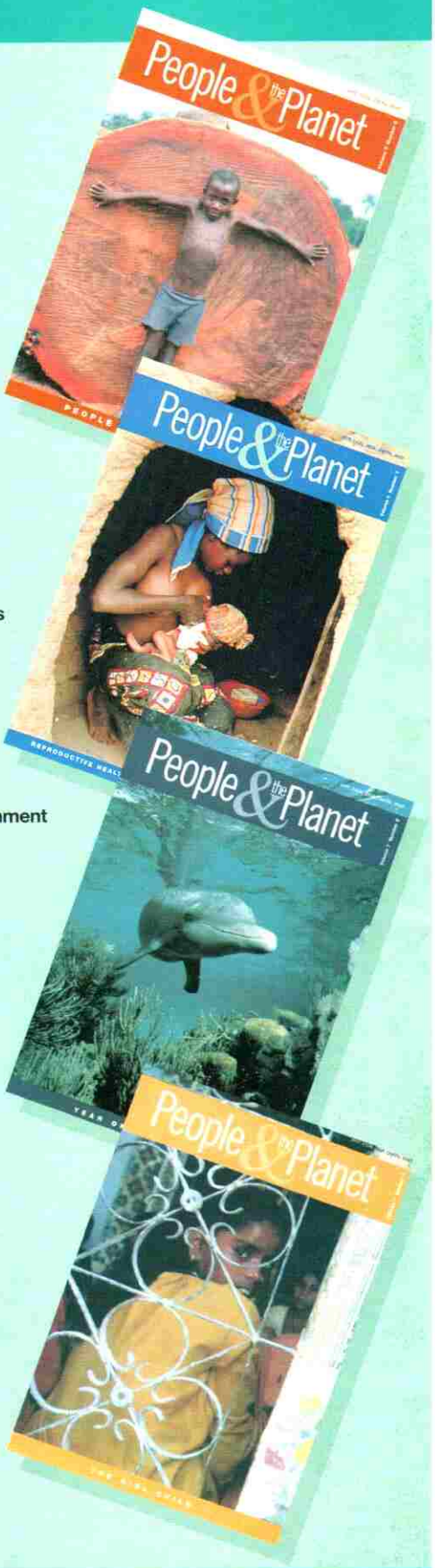

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